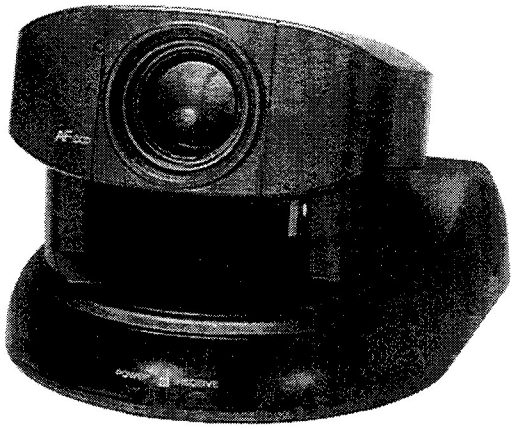
EVI-D30/D31

SERVICE MANUAL

EVI-D30 (NTSC)
EVI-D31 (PAL)



(Photo : EVI-D31)

SPECIFICATIONS

System

Video signal	EVI-D30: NTSC Color, EIAJ standards EVI-D31: PAL Color, CCIR standards
Picture element	1/3 inch color CCD (Total picture element number: EVI-D30: Approx. 410,000 EVI-D31: Approx. 470,000) (Effective picture element number: EVI-D30: Approx. 380,000 EVI-D31: Approx. 440,000)
Lens	Electromotion twelve fold zoom lens f=5.4 to 64.8mm, F1.8 to F2.7 Horizontal angle: 4.4° to 48.8°
Point-blank range	WIDE end : 10mm TELE end : 800mm
Minimum illumination	7 lux (F1.8)/with 50IRE
Illumination range	7 to 100,000 lux
Shutter speed	EVI-D30: 1/60 to 1/10,000 (VISCA control) EVI-D31: 1/50 to 1/10,000 (VISCA control)
Gain selector	Automatic/manual
Horizontal resolution	NTSC : 460 TV PAL : 450 TV
Video S/N	48 dB
Pan/tilt action	Horizontal: 100°, Vertical: 25°

Input/output terminals

Video output	RCA pin jack (1), 1Vpp, 75 ohm unbalanced Synchronization: negative
S video output	4 pin mini DIN (1)
Audio output	RCA pin jack, monaural (1) Rated output: 327 mV Output impedance: less than 2.2 kilohms
Input/output control terminals	RS232C (input: 1, output: 1), 8 pin mini DIN, 9600bps Data: 8 bit Stop bit: 1
Microphone input terminal	Mini jack (monaural) (1) (ø 3.5) Rated input 0.775 mV DC 3V for low impedance microphone Input impedance: more than 10 kilohms
Power terminal	EIAJ type4

– Continued on next page –

MICROFILM

COLOR VIDEO CAMERA

SONY®

General

Input voltage	DC 12 to 14 V
Power consumption	11 W
Operating temperature	0° to 40° (32° to 104°F)
Storage temperature	– 20° to 60° (– 4° to 140°F)
Dimensions	Video camera: Approx 142 × 109 × 164 mm (5 3/8 × 4 3/8 × 6 1/2 in.) (w/h/d) Remote commander: Approx. 56 × 26 × 210 mm (2 1/4 × 1 1/16 × 8 3/8 in.) (w/h/d)
Mass	Video camera: Approx. 1,200 g (42.3 oz.) Remote commander: Approx. 109 g (3.8 oz)

Supplied accessories

AC power adaptor (1)
Audio/video cable (1)
Remote commander (1)
Velcro tape (3 sets)

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.

2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.

3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.

4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.

5. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.

6. Flexible Circuit Board Repairing
   - Keep the temperature of the soldering iron around 270°C during repairing.
   - Do not touch the soldering iron on the same conductor of the cir cuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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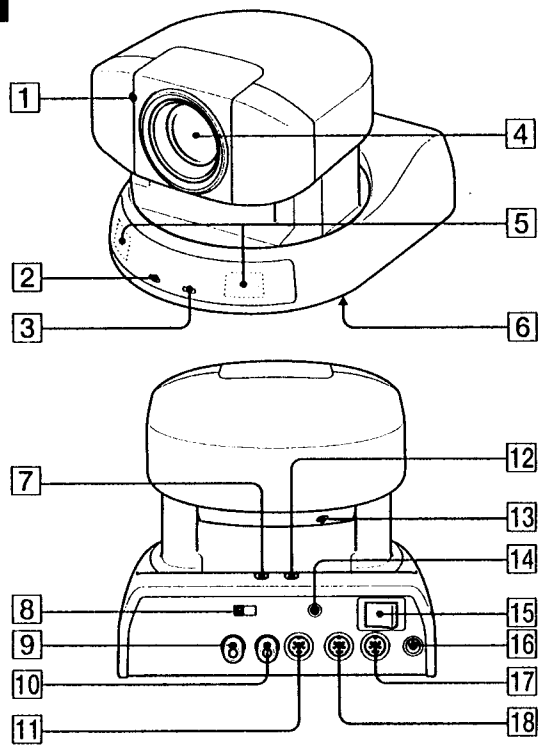
• For Camera Color Reproduction Adjustment 127

Locations of Controls

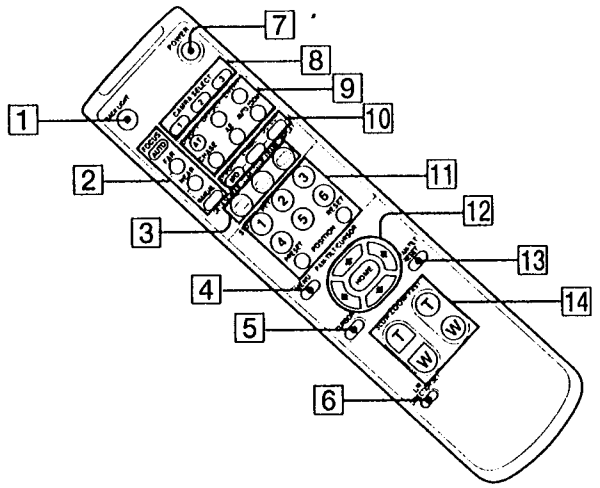
For details, see the pages indicated in ●.

Main unit



[1] Caution lamp ●●●
[2] POWER lamp ●
[3] RECEIVE lamp
[4] Lens
[5] Receptor for remote commander ●
[6] IR OUT switch
Use when equipment such as a VTR and personal computer, and/or another Color Video Camera are connected with a VISCA cable.
[7] TIME button ●
[8] CAMERA NO. switch ●●
[9] VIDEO OUT jack ●
[10] AUDIO OUT jack ●
[11] S VIDEO OUT jack ●
[12] DATE button ●
[13] BACK UP switch ●
[14] MIC jack ●
[15] POWER switch ●
[16] DC IN 13.5V jack ●
[17] VISCA OUT jack ●
[18] VISCA IN jack ●

Remote commander



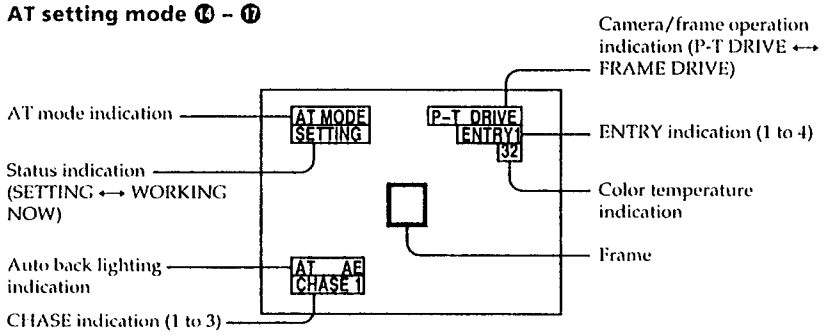
[1] BACK LIGHT button ●
[2] FOCUS buttons ●
AUTO button
FAR button
NEAR button
MANUAL button
[3] DATA SCREEN button ●
START/STOP button ●●
FRAME DISPLAY button ●
[4] MENU button ●
[5] CURSOR button ●
[6] L/R DIRECTION SET button ●
[7] POWER switch ●
[8] CAMERA SELECT buttons ●
[9] AT mode buttons
AT ON/OFF button ●
OFF SET button ●
ENTRY button ●
CHASE button ●
AE button ●
AUTO ZOOM button ●
[10] MD mode buttons
MD ON/OFF button ●
FRAME button ●
DETECT button ●
[11] POSITION buttons ●
Numeric buttons (Button 1 also works as the STD button./Button 2 also works as the REV button.) ●
PRESET button
RESET button
[12] PAN-TILT/CURSOR button ●●●●
Arrow buttons
HOME button
[13] PAN-TILT RESET button ●
[14] ZOOM buttons ●
SLOW T button
SLOW W button
FAST T button
FAST W button

continue to next page

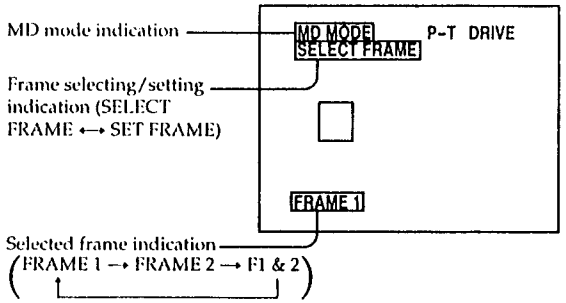
This section extracted from instruction manual.

Screen indications

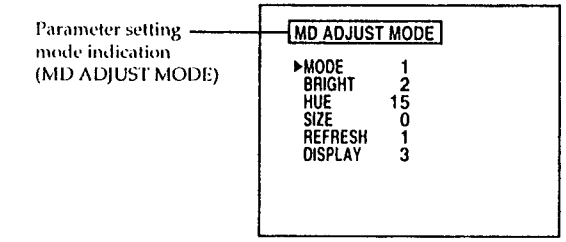
AT setting mode ⓮ – ⓱



MD setting mode ⓲⓳



MD adjusting mode ⓴



Precautions

- The name plate indication operating voltage, power consumption, etc. is located on the bottom exterior.
- After operating the unit with an AC power adaptor, disconnect the AC power adaptpr from the wall outlet if the set is not to be used for an extended period of time. The POWER switch on the rear of the main unit, does not turn the AC adaptor off.

Brightness of a subject

Color Video Camera might not work with its best performance in a place where brightness exceeds the illumination range (such as a place exposed to direct sunlight).

Avoid specialized application

Avoid using Color Video Camera for monitoring application where it would be forced to focus on a stationary object for a long period of time. Also avoid focusing the camera on an extremely bright object such as sunlight or a fluorescent lamp. Otherwise the color filter might be damaged.

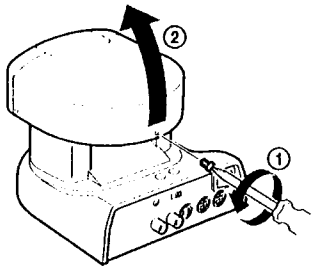
Precaution on copyright

Television programs, pictures, magazines, and other materials may be copyrighted. Unauthorized recording or storing of such materials violates the provision of the copyright laws.

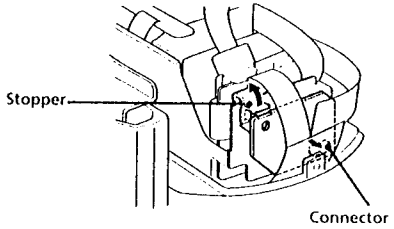
When you discard Color Video Camera

For environmental reasons, take out a lithium battery from the camera and discard it accordingly.

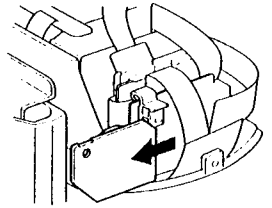
1 Remove the screw at the rear of the camera head using a Phillips type screw driver and detach the cabinet.



2 Remove the stopper and connector.



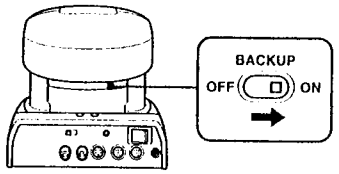
3 Remove the lithium battery together with the board.



Dispose of the lithium battery according to the local law.

About backup

The memories of the settings such as the clock, camera's position and MD function are erased when the POWER switch on the main unit is set to OFF. To retain those memories, set the BACK UP switch, at the rear of the camera head, to ON.

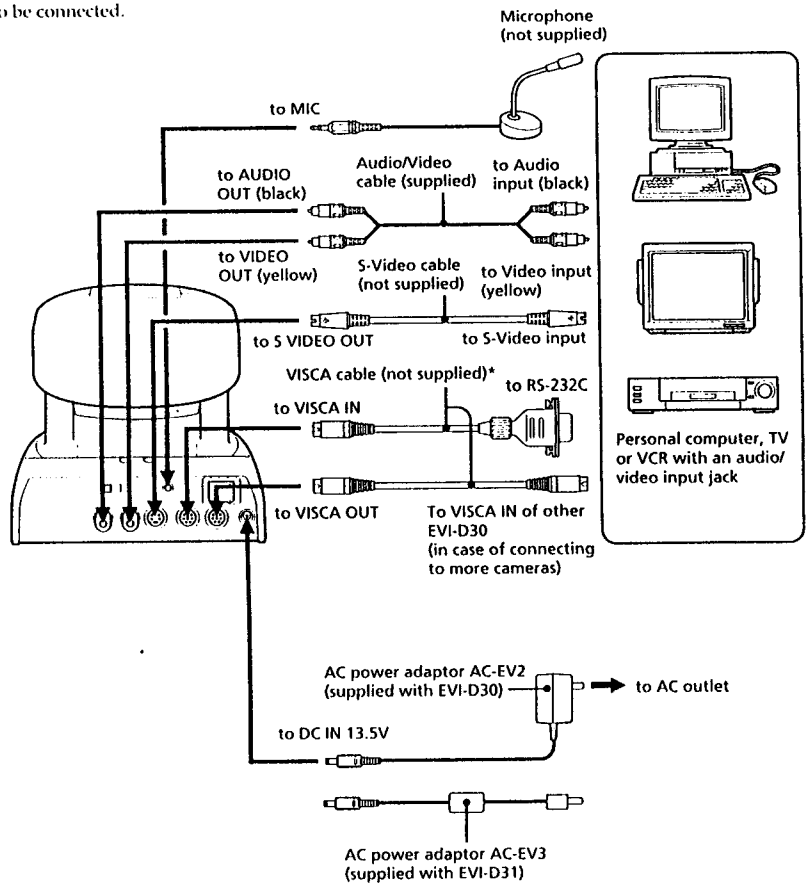


Notes

- In this unit, the built-in lithium battery acts as the power source for retaining the memories and is kept charged as long as the unit is used. If the unit is used for shorter period of time with the BACKUP switch set to ON, however, the battery is gradually discharged. Besides, if you do not use the unit at all for almost 12 weeks, the battery is completely discharged. To retain the memories of the settings, you should recharge the battery.
- To recharge the battery, plug in the unit to an AC outlet with the AC power adaptor and leave it for approximately 48 hours with the POWER switch on the main unit set to ON.

Connections

Connect your Color Video Camera to a personal computer, TV or VCR equipped with an audio/video input. Some connections may require extra cables. Refer to the instructions manual of the equipment to be connected.



* When the video camera is connected to a personal computer with a VISCA cable, you can operate the video camera with the personal computer.

If you have a personal computer or audio/video equipment with the S-Video input

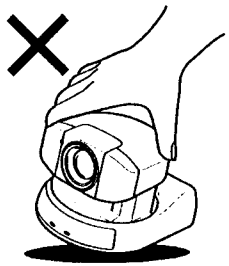
You can connect it to your Color Video Camera with a commercially available S-video cable.

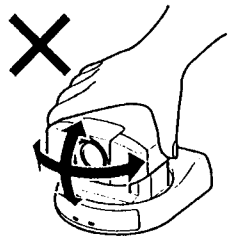
Notes

- You cannot connect your Color Video Camera to a personal computer that is not equipped with either audio/video input or S-Video input jack. And you might not be able to use your existing personal computer with your Color Video Camera unless you provide the computer with a video capture board, sound board, and/or software. Consult your computer dealer or manufacturer for details.
- Use only the AC-EV2 (for EVI-D30)/AC-EV3 (for EVI-D31) AC power adaptor (supplied). Do not use any other AC power adaptor.

Polarity of the plug

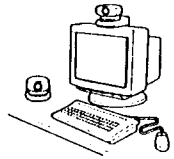
- Do not grasp the camera head when carrying the video camera.
- Do not turn the camera head manually. Doing so will result in the camera malfunctioning.



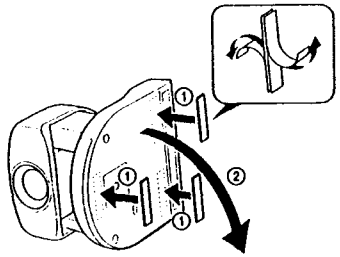


Installation

Be sure to place the main unit on a flat surface.



Secure the camera in place with the supplied Velcro tape.



If you operate more than one camera with the remote commander

Notice the CAMERA NO. switch at the rear of the main unit. Set the CAMERA NO. switch to the position that is different from the positions to that of what the other cameras' CAMERA NO. switches are set. (See page 11.)

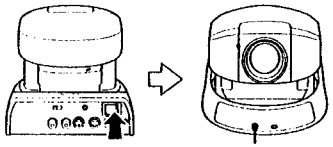
Turning on the Power

1 Turn on the POWER switch at the rear of the main unit.

The POWER lamp lights up.

As long as the POWER switch on the main unit is set to ON, you can turn on or off the camera with the POWER switch on the remote commander.

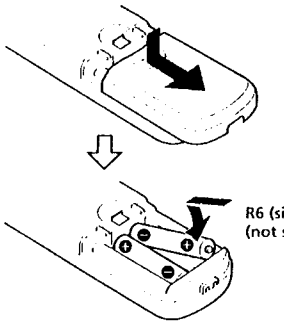
When the power is turned on, the camera will automatically face toward the lower right-hand side and then the front, which is the home position of the camera. (Pan/tilt reset action)



Light up.

2 Turn on the peripheral devices.

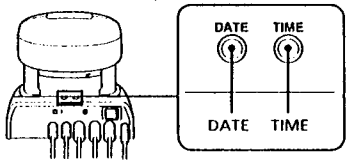
Installing batteries



R6 (size AA) x 2 (not supplied)

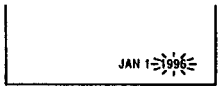
Setting the Clock

Use the buttons on the main unit to set the clock.

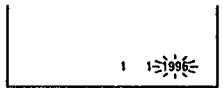


1 Press the DATE and TIME buttons at the same time and hold them down for about 2 seconds. Release your hand as the month and date appear and the year starts flashing.

EVI-D30



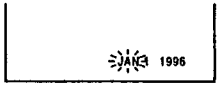
EVI-D31



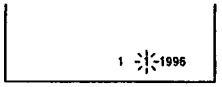
2 Repeat pressing the DATE button to select the year.

3 Press the TIME button to set the year.

EVI-D30



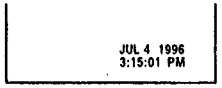
EVI-D31



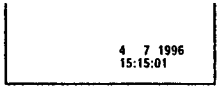
4 Repeat the steps 2 and 3 to set the other time elements in the order of month, date, hour, and minute.

The clock starts operating as you press the TIME button to set the minute.

EVI-D30



EVI-D31



Having the clock displayed

You can select the clock display from either time or date.

To have the time displayed, press the TIME button.

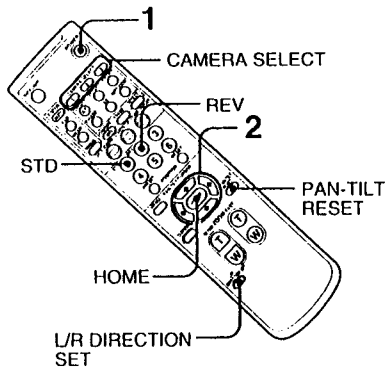
To have the date displayed, press the DATE button.

To turn off the clock display, press the corresponding button again.

Note

When the POWER switch on the main unit is set to OFF, the clock will be as originally was. To retain the memory of the clock setting even if the power is turned off, set the BACKUP switch, at the rear of the camera head, to ON. (See "About backup" on page 25.)

Pan/Tilt Operation



1 Press the POWER button.

The camera will be turned on, performing the pan/tilt reset action automatically.

2 Press the arrow button to perform the pan/tilt operation.

While checking the picture on the screen, press a desired arrow button.

To move the camera inch by inch, press the button for a moment.

To move the camera in a wide range, press and hold down the button.

To move the camera diagonally, press the arrow button (or) while holding down the arrow button (or).

To face the camera back to the front

Press the HOME button.

If you accidentally move the camera with your hand

Press the PAN-TILT RESET button to reset the pan/tilt position.
The deviation from the position that the camera memorizes will be corrected and the operation will be back in order.

If you wish to face the camera toward the opposite direction in which the arrow on a pressed button points

The camera is preset to face toward the right whenever the arrow ( ) button is pressed. You might wish to face the camera toward the opposite direction in which the arrow on a pressed button points, in such a case when you change the direction of the camera while checking the picture on the screen. In this case, press the REV button while holding down the L/R DIRECTION SET button.
To reset that setting, press the STD button while holding down the L/R DIRECTION SET button.

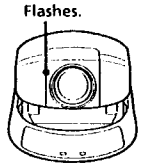
Arrow button	Movement of the camera	Setting
		While holding down L/R DIRECTION SET, press STD (1)
		While holding down L/R DIRECTION SET, press REV (2)

Note

Repeat the above-mentioned procedure for each remote commander if you are using more than one remote commander. This is because the setting is performed by changing the signal emitted from each remote commander, not by changing the setting of the camera itself.

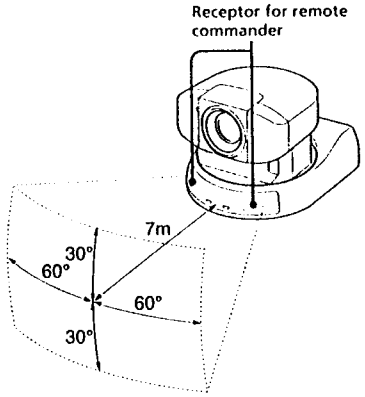
If the lamp at the side of the lens flashes red

The micro computer inside the camera might not memorize the current pan/tilt position properly. Press the PAN-TILT RESET button to reset the pan/tilt position.



Operating range of the remote commander

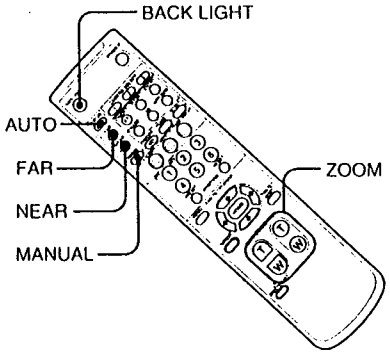
Use the remote commander within the range described below, facing it toward the receptor for the remote commander.



Operating more than one camera with the remote commander

Notice the CAMERA NO. switch at the rear of the camera to be operated.
Press a CAMERA SELECT button whose number is the same as the number to which the CAMERA NO. switch is set.
A pressed CAMERA SELECT button lights up when either of the other button is pressed.

Adjusting the Camera



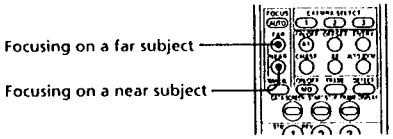
Focusing on a subject

To focus the camera on a subject automatically

Press the AUTO button.
The camera focuses on the subject at the center of the screen automatically.

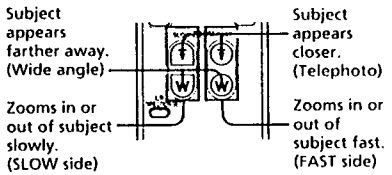
To focus the camera on a subject manually

After pressing the MANUAL button, press either FAR or NEAR button to have the camera focus on the subject.



Zooming

Press either of the four ZOOM buttons.



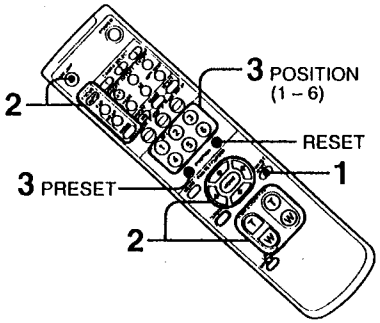
Shooting with back lighting

When you shoot a subject with a light source behind it, the subject becomes dark. In such a case, press the BACK LIGHT button.
To cancel the function, press the BACK LIGHT button again.

Having the Camera Memorize the Setting

—Presetting feature

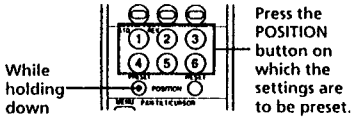
Up to six combinations of the setting (position, zooming, focusing and back lighting) can be preset.



1 Press the PAN-TILT RESET button to reset the pan/tilt position.

2 Adjust the position, zooming, focusing, and back lighting of the camera. (See on page 11.)

3 While holding down the PRESET button, press either of the POSITION buttons 1 – 6.

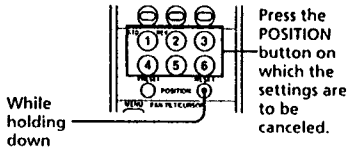


Recalling the memorized setting

Press either of the POSITION buttons 1 – 6.

Canceling the preset memory

While holding down the RESET button, press the POSITION button on which the settings are to be canceled.



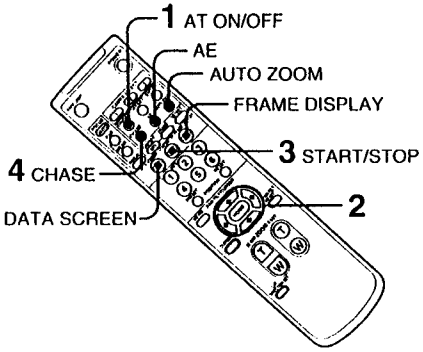
Notes

- Before presetting, be sure to reset the pan/tilt position. Otherwise the correct position will not be memorized.
- The memorized information is retained until the power of the main unit is turned off. To retain the memory even if the power is turned off, set the BACKUP switch, at the rear of the camera head, to ON. (See "About backup" on page 25.)

Tracking a Subject Automatically

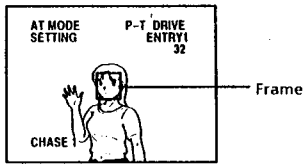
—AT (Auto target tracking) function

You can have the camera memorize certain color and brightness so that it automatically tracks a subject having the memorized color and brightness.



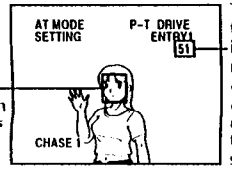
1 Press the AT ON/OFF button to enter into the AT setting mode.

The frame and setting value appear.



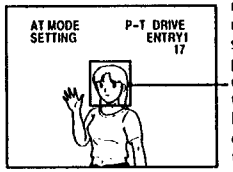
2 Press the arrow button to perform the pan/tilt operation so that a subject is placed into the frame.

Be sure to place the subject so that the portion uniform in *brightness* and color is in the frame.



The larger the value is, the more easily the camera *recognizes* the subject.

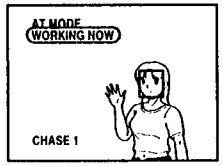
Example of the case when a subject is hardly recognized



The camera might not recognize a subject if the portion different from the subject in brightness and color, such as the backdrop, is placed together in the frame.

3 Press the START/STOP button to activate the AT function.

Try moving the subject to see if the frame tracks it automatically.



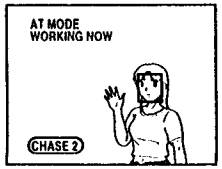
When the frame tracks the subject, proceed with the step 4.

When the frame does not track the subject, repeat the step 3 until the frame starts tracking the subject while adjusting the lighting and the position of the subject so that the color and brightness of the subject is optimized. If the frame still does not track the subject, see "If the subject cannot be recognized or captured" on page 17.

4 Repeat pressing the CHASE button to select a desired CHASE mode.

Each time that button is pressed, the mode is cyclically changed as follows:

CHASE 1 → CHASE 2 → CHASE 3



MODE	Tracking method	Intended use
CHASE 1	The pan/tilt action is not performed. (Camera does not move.) The frame tracks a subject only in the range of the screen.	Used to check if the subject is recognized.
CHASE 2	The frame tracks a subject while the pan/tilt action is performed. In this mode, the subject is always placed in the middle of the screen.*	Used to perform normal tracking operation.
CHASE 3	Uses the same tracking method as that of CHASE 1 except that if a subject almost goes out of the screen, the camera performs the pan/tilt action so that the subject is placed in the middle of the screen.*	Used when you wish to limit the camera movement as possible, in such a case when you perform the image transmission.

* The position in which the subject is to be placed can be changed from the middle of the screen. See "Changing the frame position" on page 16.

If the frame is repeatedly extended to the full screen

The camera does not recognize the subject. Press the START/STOP button and go back to the step 2. If doing so does not solve the problem, see "If a subject cannot be recognized or captured" on page 17.

To turn off the setting value and/or frame

If the setting value and/or frame are displayed as you record a picture, those come with the recorded picture.

To turn off the setting value, press the DATA SCREEN button.

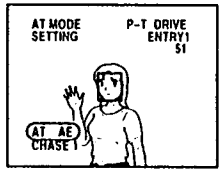
To turn off the frame, press the FRAME DISPLAY button.

Note

Once the setting value is turned off, the setting value is not displayed until the next time you press the DATA SCREEN button. However, the setting value is displayed automatically when the unit enters into the AT setting mode for the first time after the power is turned back on.

To keep the brightness of the subject as is (Auto back lighting function)

After the step 2, press the AE button.



To disactivate the function, press that button again.

Note

Be sure to press the AE button before proceeding with the step 3. This function is not activated after the START/STOP button is pressed.

To keep the size of the memorized subject as is

After the step 2, press the AUTO ZOOM button.

To cancel the function, press that button again.

To cancel the AT function

Press the START/STOP button.

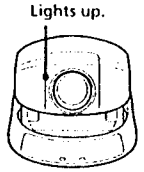
The information of the memorized subject is erased.

To exit from the AT setting mode, press the AT ON/OFF button.

If the lamp at the side of the lens light up

The camera is not capturing the memorized subject correctly.

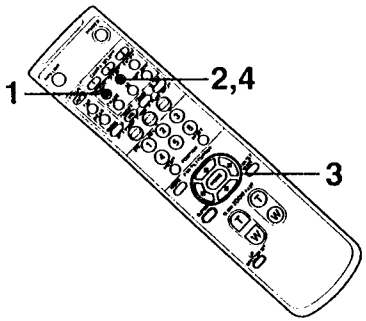
Press the arrow button to perform the pan/tilt operation so that the subject comes into the screen. Or have the subject memorized onto the camera again.



Fine-tuning the setting

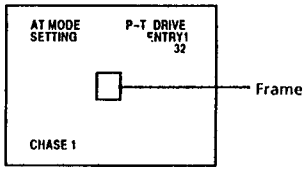
Changing the frame position

Although the frame normally appears on the middle of the screen, you can change its position to a different place. (In the CHASE 1 mode, the frame tracks a subject within the range of the screen.)

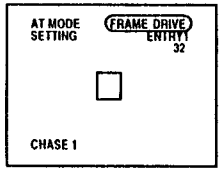


1 Press the AT ON/OFF button to enter into the AT setting mode.

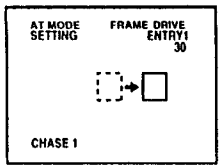
The frame and setting value appear. If the setting value does not appear, press the DATA SCREEN button to have the value displayed.



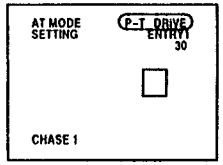
2 Press the OFF SET button to enter into the AT frame position setting mode.



3 Press the arrow button to move the frame to a desired position.



4 Press the OFF SET button to fix the frame position.

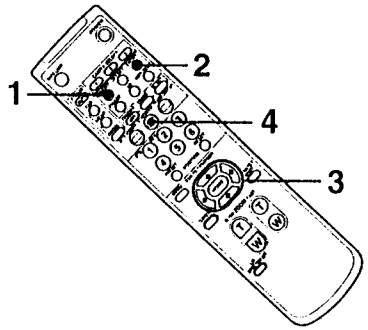


After the setting is completed, go back to the step 2 of "Tracking a subject automatically."

If a subject cannot be recognized or captured

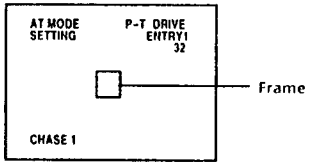
Depending on the characteristic or condition of a subject, the camera might hardly recognize the subject. If the AT function still does not work after the procedures mentioned in pages 14 and 15 are repeated, select an ENTRY mode that is matched to conditions under which the camera is used. Normally, select the ENTRY 1.

Problem	ENTRY mode to be selected
A subject cannot be recognized because its color is too thin.	ENTRY 2
The camera repeats mistakenly recognizing a near object whose color is almost identical to that of a subject. (The frame moves from the subject to an object whose color is almost identical to that of the subject.)	ENTRY 2
The camera repeats mistakenly recognizing the backdrop such as the wall or ceiling. (The frame moves from the subject to the backdrop.)	ENTRY 4
The camera does not capture a subject correctly when the brightness of the subject changes as the position of the subject changes.	ENTRY 3



1 Press the AT ON/OFF button to enter into the AT setting mode.

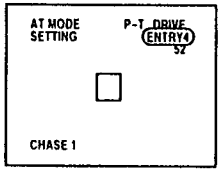
The frame and setting value appear. If the setting value does not appear, press the DATA SCREEN button to have the value displayed.



2 Repeat pressing the ENTRY button to select a desired ENTRY mode.

Each time that button is pressed, the mode is cyclically changed as follows:

ENTRY 1 → ENTRY 2 → ENTRY 3 → ENTRY 4



3 Have the camera memorize a subject by pressing the arrow button to move the subject into the frame.

The position to which you place the subject varies depending on an ENTRY mode you select.

ENTRY 2: Place the subject so that the portion uniform to a certain extent in color and brightness is in the frame.

ENTRY 3: Place the subject so that it hangs over the frame slightly.

ENTRY 4: Place the subject so that it becomes largest within the frame, its backdrop being out of the frame.

Tracking a Subject Automatically (continued)

4 Press the START/STOP button to activate the AT function.

Try moving the subject to see if the frame tracks it automatically.

If you have selected the ENTRY 3, the frame flashes for about 5 seconds after the START/STOP button is pressed. Within that period, repeat changing the angle of the subject so that the camera recognizes the various brightness of the subject.

Notes

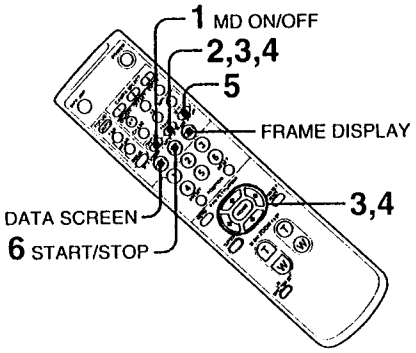
- If you use the ENTRY 2 or 4 mode for a subject that can be recognized even in the ENTRY 1 mode, the subject might be hardly recognized. This is because the color and brightness the camera can recognize are limited in the ENTRY 2 and 4 modes.
- Even if you try changing the ENTRY mode, a subject still might not be recognized depending on its characteristics. In such a case, try changing the subject to the one whose color is more bright or the one whose color is different from that of its backdrop, or changing the lighting.
- There might be a case in which the AT function will not activated in any way depending on the size, color, brightness and so on of a subject.

Detecting the Change Taking Place in the Picture

— MD (Motion Detector) function

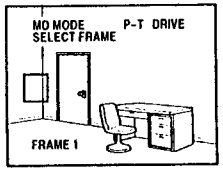
If the position of the camera is fixed, you can set the camera to detect a change taking place in a picture. When the camera detects a change taking place in the picture, the frame appears, showing the portion in which the change takes place, and the lamp at the side of the lens lights up red. (At that time, the detection signal is output from the VISCA IN.)

You can specify up to two portions in which the change is detected, by using the two frames (FRAME 1 and FRAME 2) that you can change in position and size as desired.

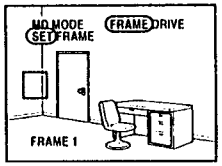


1 Press the MD ON/OFF button to enter into the MD setting mode.

The frame and setting value appear.

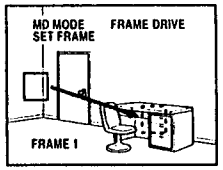


2 Press the FRAME button to enter into the detection frame setting mode.

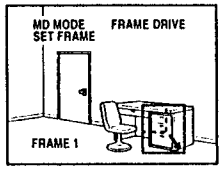


3 Decide the position and size of the FRAME 1.

① Press the arrow button to set the position of the FRAME 1. Then press the FRAME button.



② Press the arrow button to set the size of the FRAME 1. Then press the FRAME button.



That completes the settings of the FRAME 1's position and size, and enter into the setting mode of the FRAME 2.

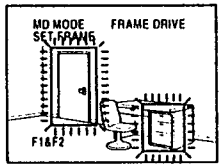
If you choose not to set the FRAME 2, proceed with the step 5.

4 Repeat the procedure of the step 3 to set the FRAME 2's position and size.

5 Repeat pressing the DETECT button to select a frame to be used.

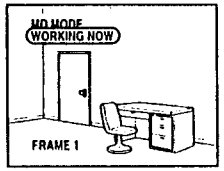
Each time that button is pressed, the frame to be used is cyclically changed as follows:

FRAME 1 → FRAME 2 → F1 & F2*



* If a change is detected even in either of FRAME 1 or FRAME 2, the lamp at the side of the lens lights up red.

6 Press the START/STOP button to activate the MD function.



To turn off the setting value and/or frame

If the setting value and/or frame are displayed as you record a picture, those come with the recorded picture.

To turn off the setting value, press the DATA SCREEN button.

To turn off the frame, press the FRAME DISPLAY button.

To cancel the MD function

Press the START/STOP button.

To exit from the MD mode, press the MD ON/OFF button.

Note

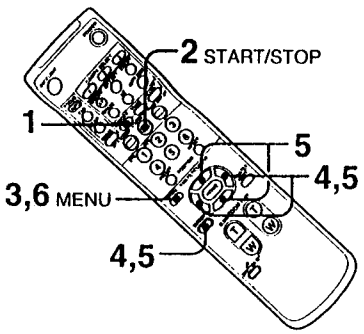
Once the frame is set, it remains memorized until the power is turned off.

To retain the memory of the frame setting even if the power is turned off, set the BACKUP switch, at the rear of the camera head, to ON. (See "About backup" on page 25.)

Fine-tuning the settings

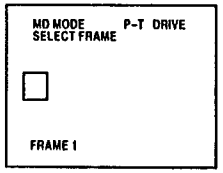
The MD function works in the following manner: the camera memorizes a picture of a certain moment as the "reference picture," and compares the current picture with the reference picture to detect whether or not a change takes place.
Although the camera is factory-set to refresh a reference picture after a certain period of time, you can change the timing when a reference picture is refreshed or can set the camera not to refresh the reference picture, according to conditions under which the camera is used.
In addition, you can adjust the parameter that sets the camera to detect a certain kind of change such as color and brightness.

Condition under which the camera is used	Reference picture refreshing mode to be selected	When to refresh
Sunlight comes in, and the light source changes over time.	MODE 1	The reference picture is automatically refreshed after a certain period of time (Factory-setting : approx. 0.1 second)
• Sunlight comes in, and the quantity of light changes over time. • You wish to have the camera detect only a sudden change.	MODE 2	The reference picture is automatically refreshed after a certain period of time unless a change has taken place in the picture. When a change is being detected, the reference picture is not refreshed.
• Sunlight does not come in, and the brightness of the light source does not change. • You wish to have the camera detect even a slight change.	MODE 3	The reference picture is always as originally was.



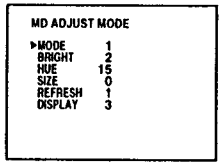
1 Press the MD ON/OFF button to enter into the MD setting mode.

The frame and setting value appear. If the setting value does not appear, press the DATA SCREEN button to have the setting value displayed.



2 Press the START/STOP button to start the detection operation.

3 Press the MENU button to enter into the MD ADJUST MODE.



4 While holding down the CURSOR button, press the arrow button (or) to select a desired reference picture refreshing mode (1 – 3).

5 Adjust each parameter.

① While holding down the CURSOR button, press the arrow button (or) to select a desired parameter.
② While holding down the CURSOR button, press the arrow button (or) to select a desired value.

Adjust the value of each parameter as specified below, in the order from top to bottom.

	MODE 1	MODE 2	MODE 3
BRIGHT	2	2	2
HUE	15	15	15
SIZE	0	0	0
REFRESH	1	8	–*
DISPLAY	3	0	0

*When the MODE 3 is selected, you cannot change the value of REFRESH since the reference picture is not refreshed in that mode.

6 Press the MENU button to complete the setting.

If the detection operation is not performed properly, see "Adjusting the value of each parameter."

Adjusting the value of each parameter

At the step 5 of "Fine-tuning the setting," you can adjust the value of each parameter as desired.
Refer to the following information provided below and adjust the value of each parameter while checking how the detection operation is performed.

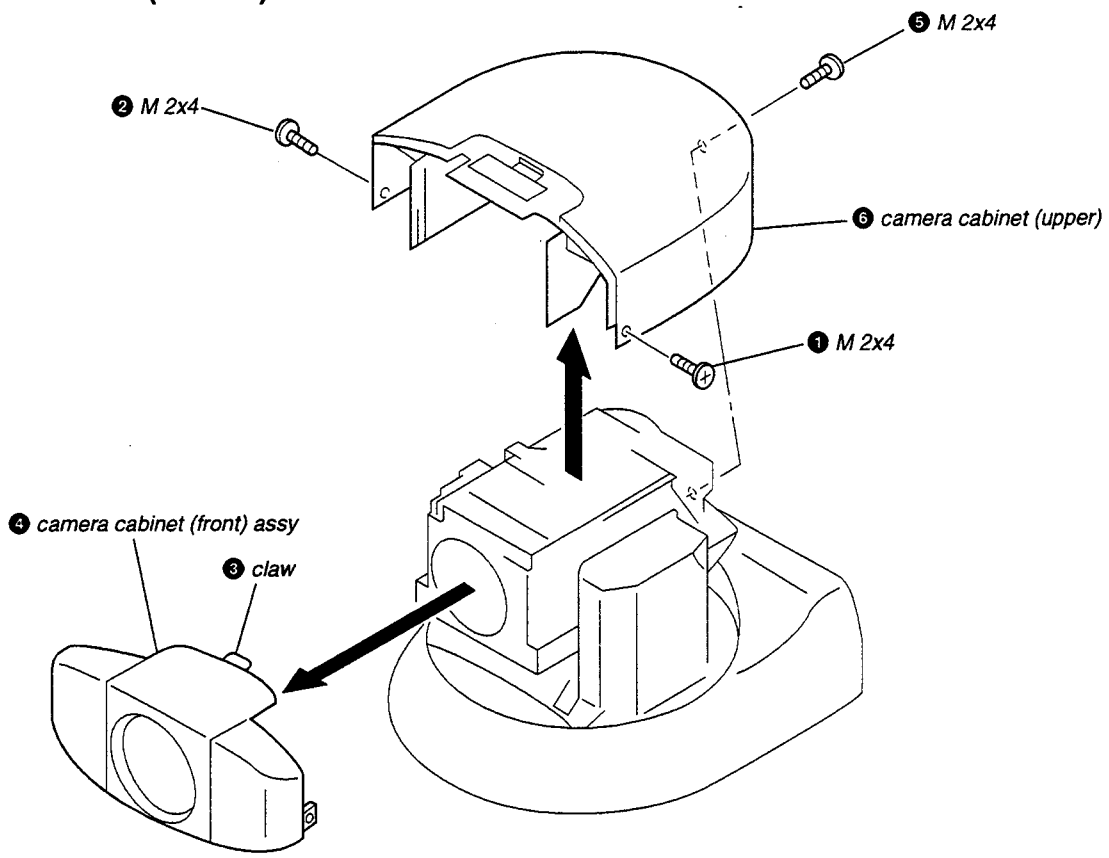
Parameter	Content/Tips in setting	Adjustable range
BRIGHT*1 (Sensitivity to brightness)	Sets the sensitivity to a change in brightness. The lesser the value, the more sensitively the camera detects the change. Adjust this value within the range in which an error does not occur.	0 to14, 15 (Parameter disabled)
HUE*2 (Sensitivity to hue)	Sets the sensitivity to a change in color. The lesser the value, the more subtle change in color the camera detects. Adjust this value when the camera hardly detects the change with only the BRIGHT adjusted, in such a case when the brightness of a subject to be captured is almost identical to that of its backdrop.	0 (5°) to 14 (75°), 15 (Parameter disabled)
SIZE*3 (Sensitivity to size)	Sets the sensitivity to the size of the frame area being taken up by a changed portion. Adjust this value in such a case when you wish to have the camera detect only a greater change.	0 (approx. 0.3%) to 15 (approx. 20%)
REFRESH*4 (Reference picture refreshing timing)	Sets the period of time for which the reference picture is retained.	0 (0.07 sec.) to 15 (60 min.)
DISPLAY (Signal output duration)	Sets the period of time for which the detection signal continues to be generated once a change has been detected.	0 (0.07 sec.) to 14 (30 min.), 15 (continuous)

*1 After the value of the BRIGHT has been changed, the value of the HUE is automatically set to 15 and the value of the SIZE to 0.
*2 After the value of the HUE has been changed, the value of the BRIGHT is automatically set to 15, and the value of the SIZE to 0.
*3 Be sure to adjust the value of the SIZE after adjusting the values of the BRIGHT and HUE.
• The camera might not be able to detect a change if both the size of the frame and the value of the SIZE are too small.
*4 Can be adjusted only when the camera is in the MODE 1 or MODE 2.

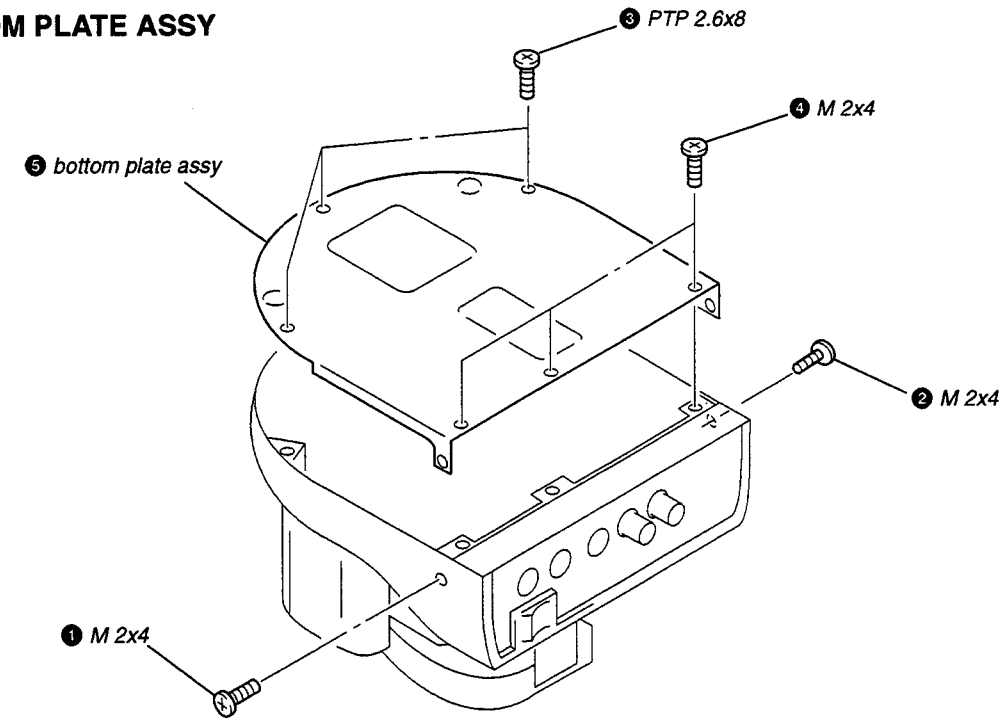
SECTION 2
DISASSEMBLY

Note : Follow the disassembly procedure in the numerical order given.

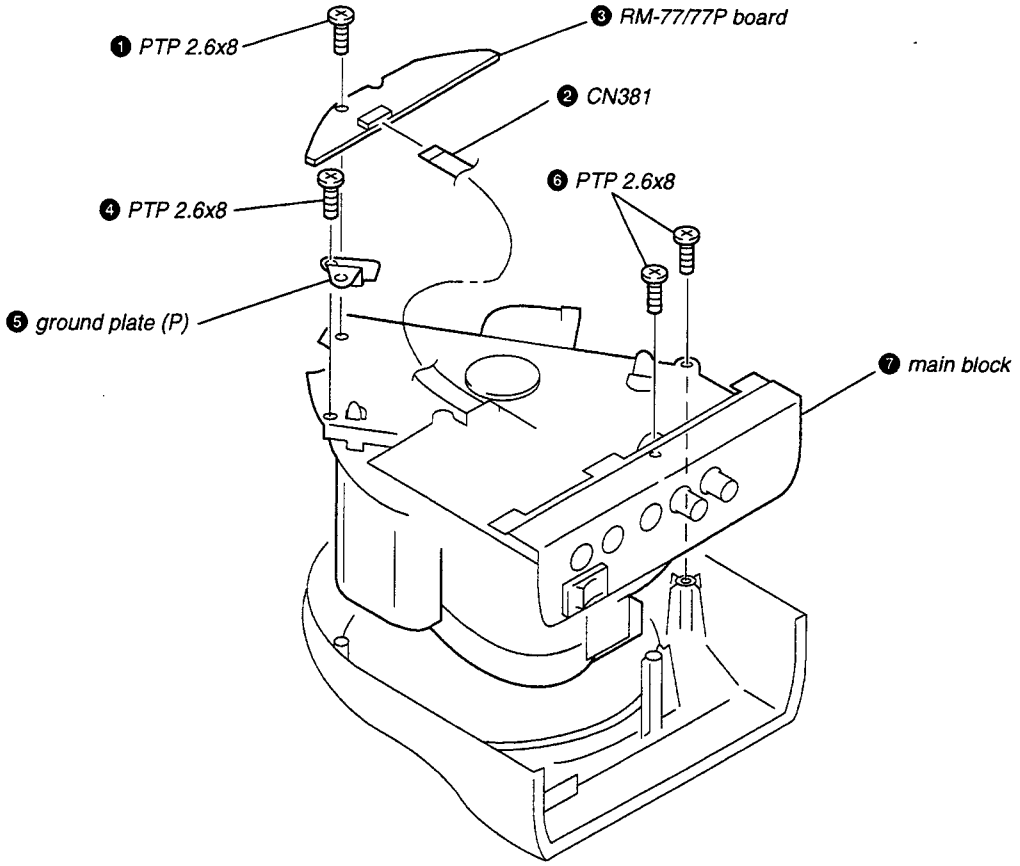
2-1. CAMERA CABINET (UPPER)



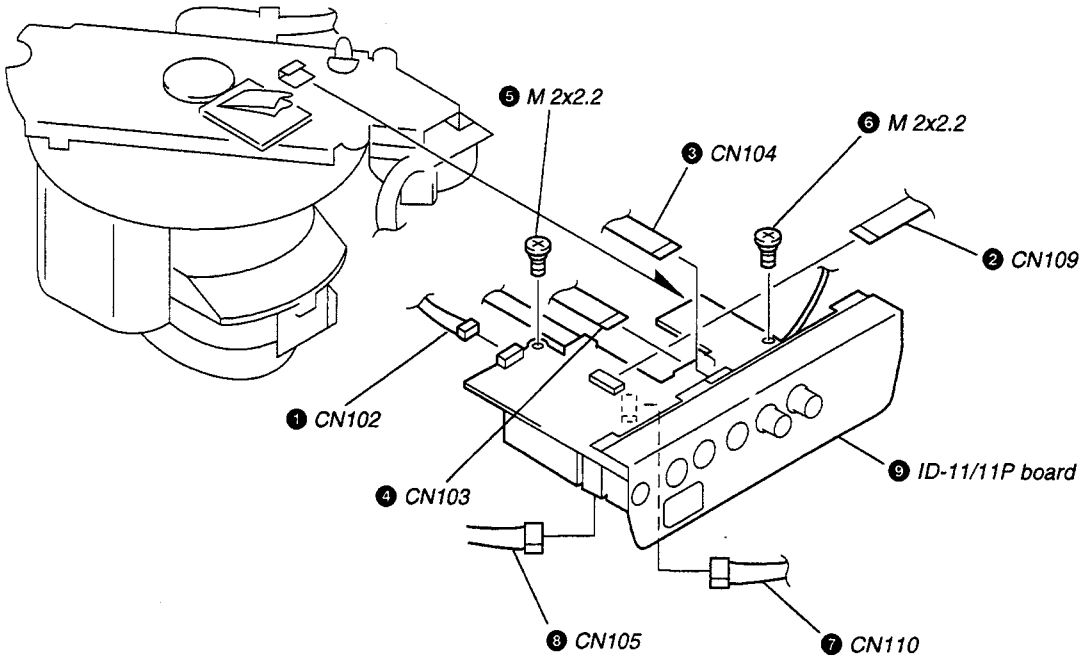
2-2. BOTTOM PLATE ASSY



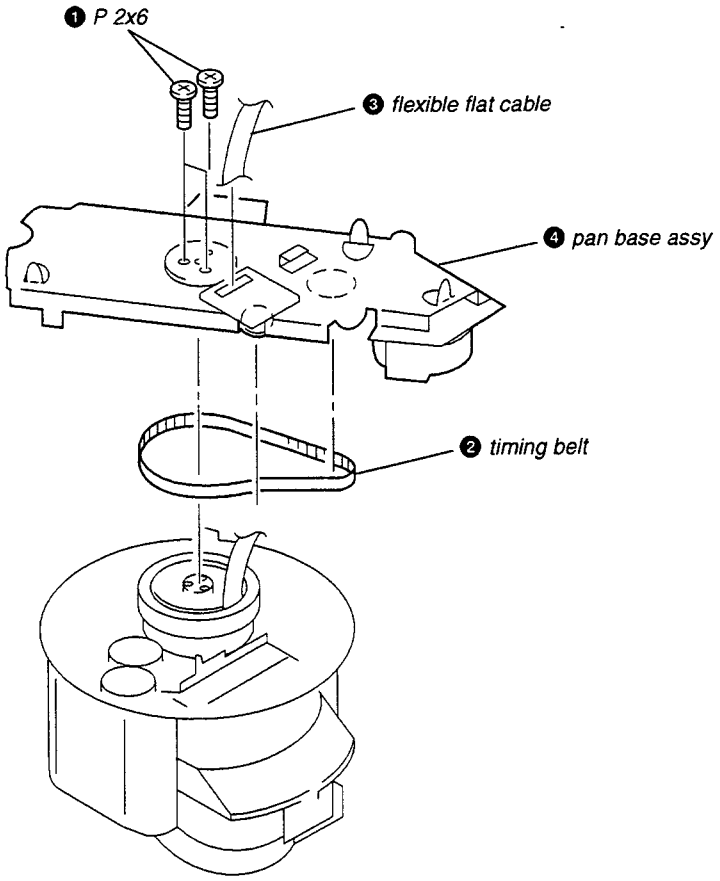
2-3. MAIN BLOCK



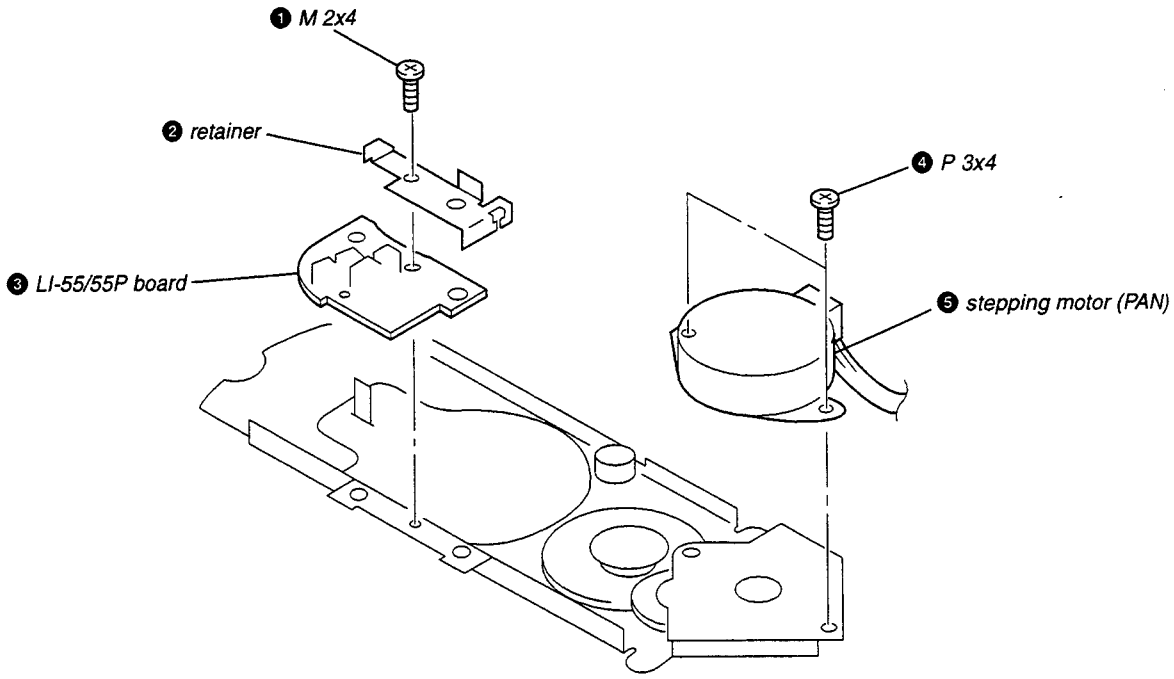
2-4. ID-11/11P BOARD



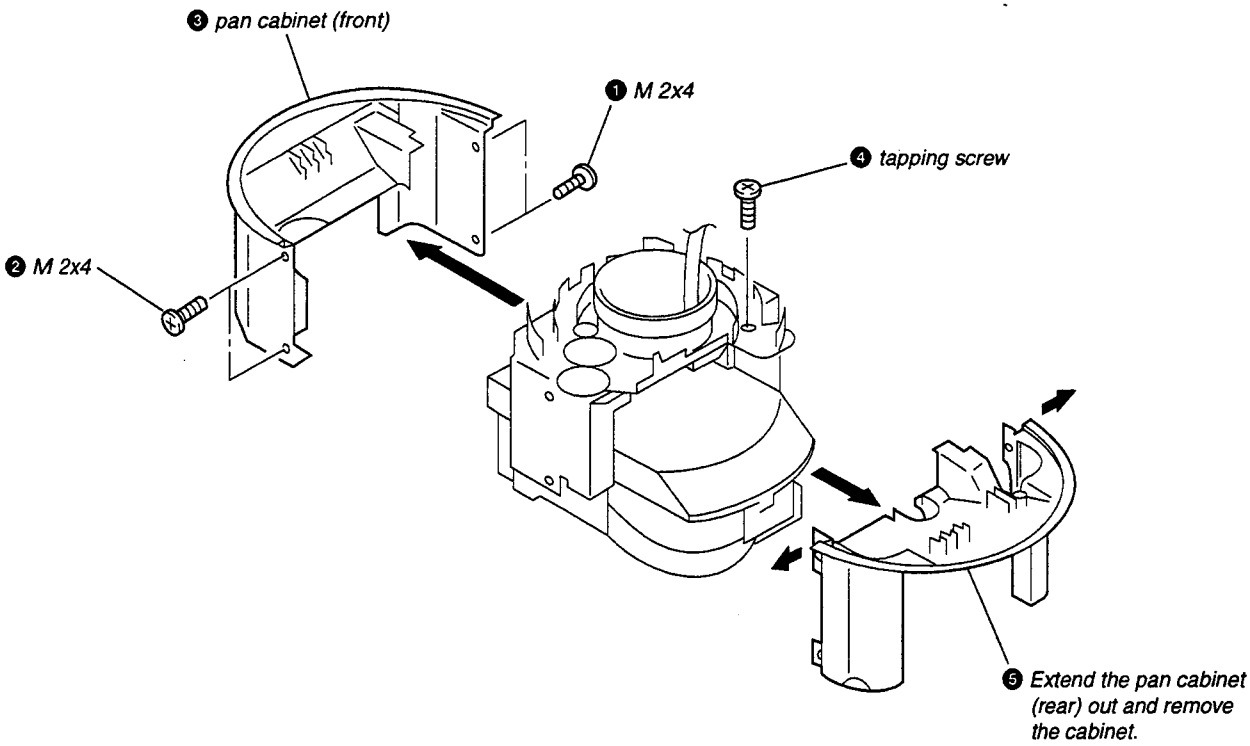
2-5. PAN BASE ASSY



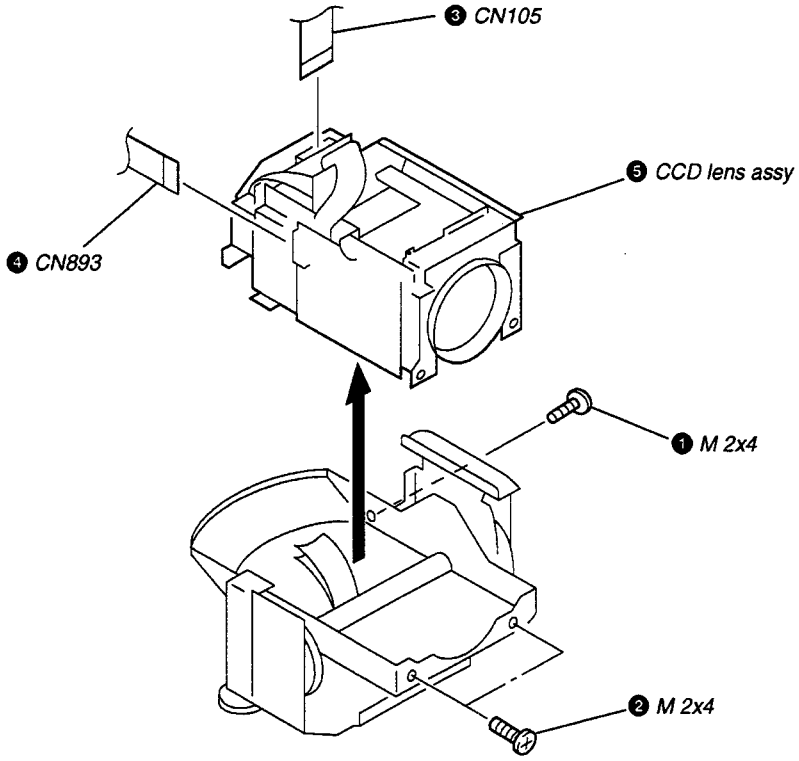
2-6. LI-55/55P BOARD



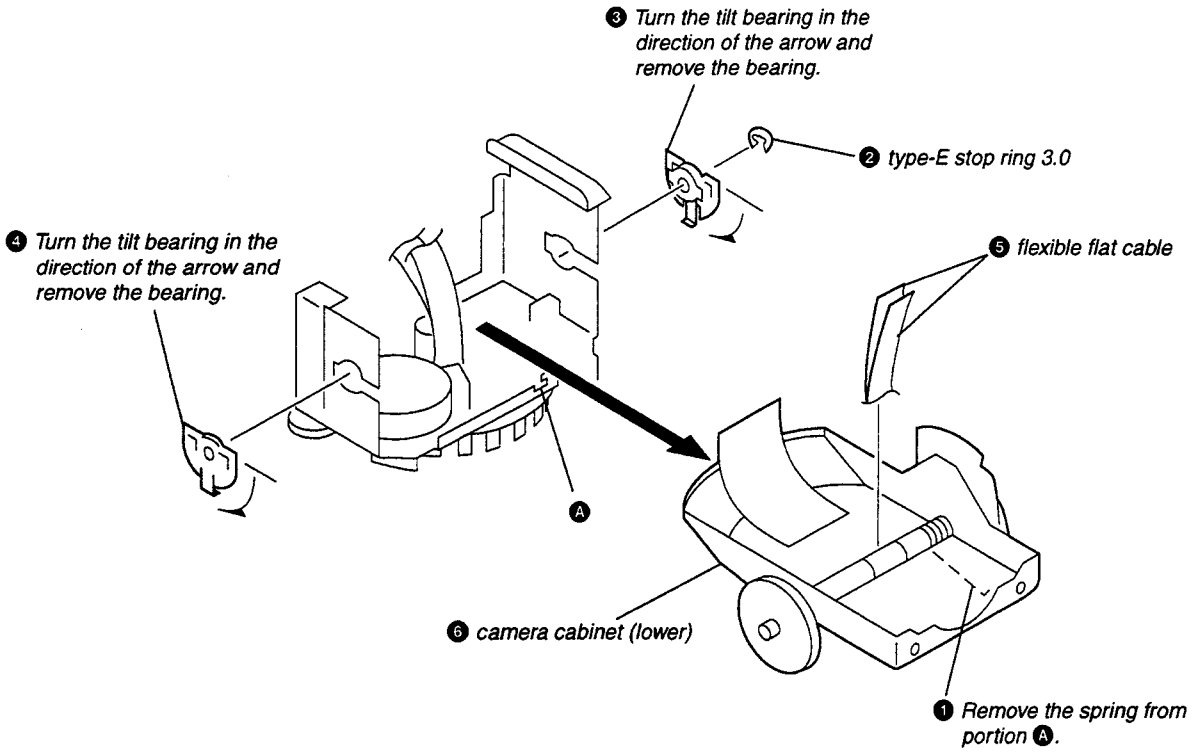
2-7. PAN CABINET



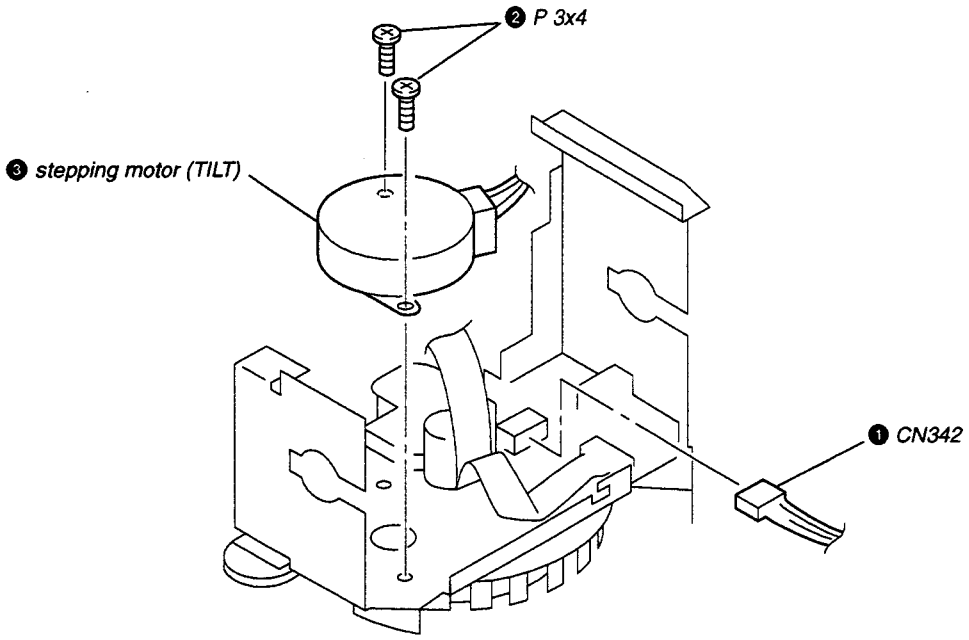
2-8. CCD LENS ASSY



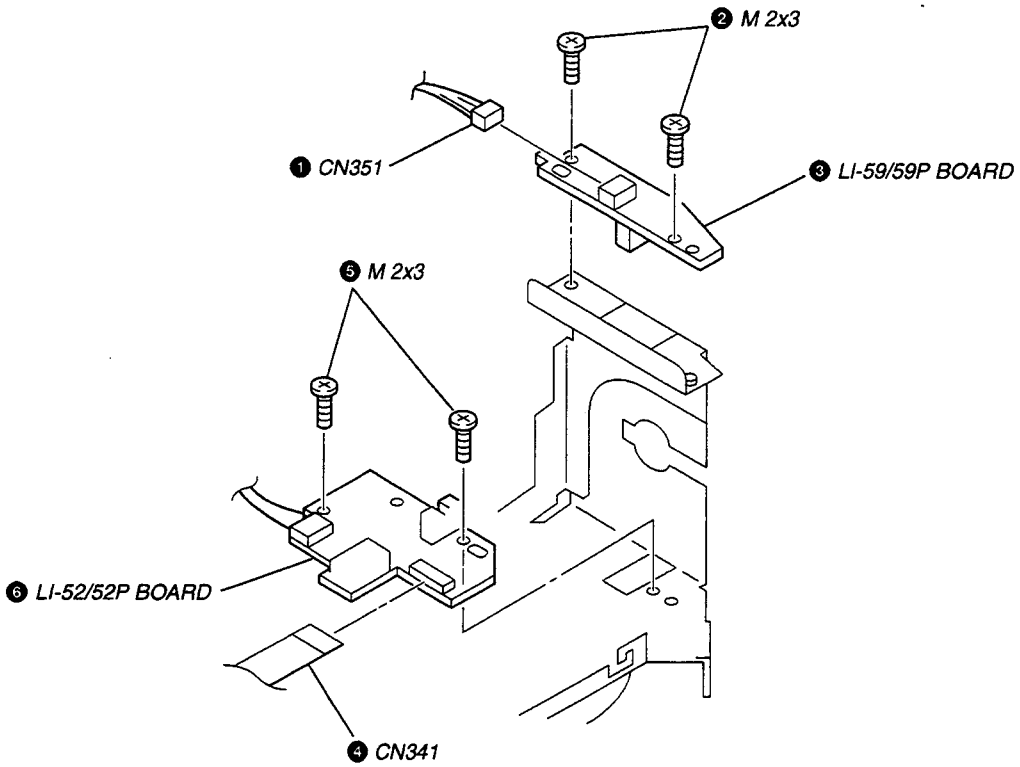
2-9. CAMERA CABINET (LOWER)



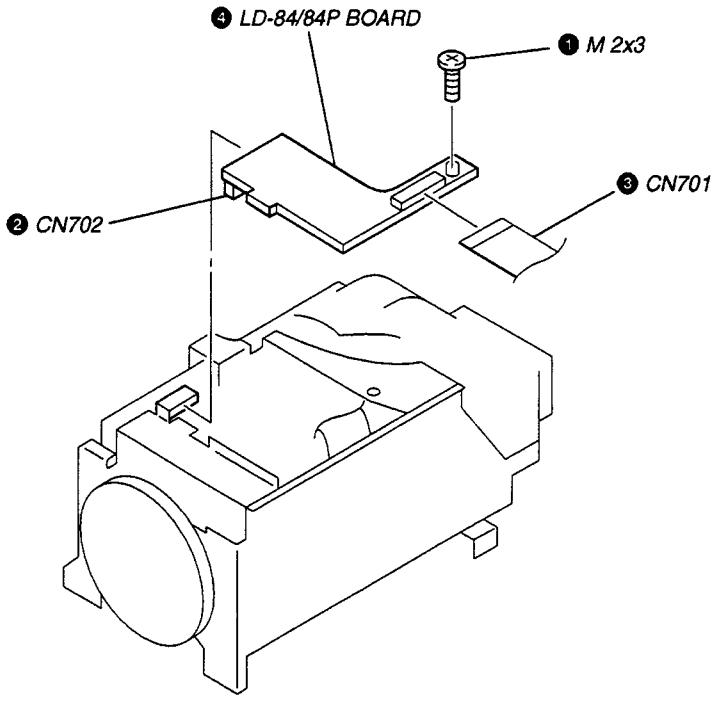
2-10. STEPPING MOTOR



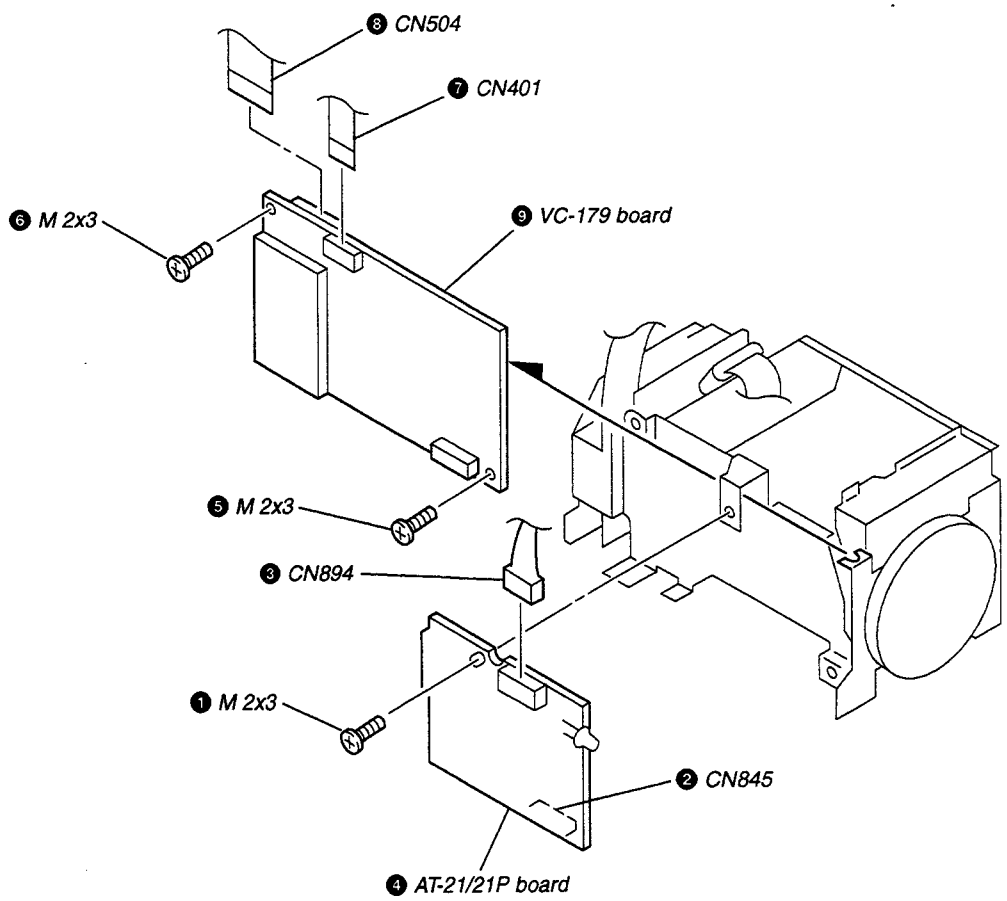
2-11. LI-59/59P BOARD



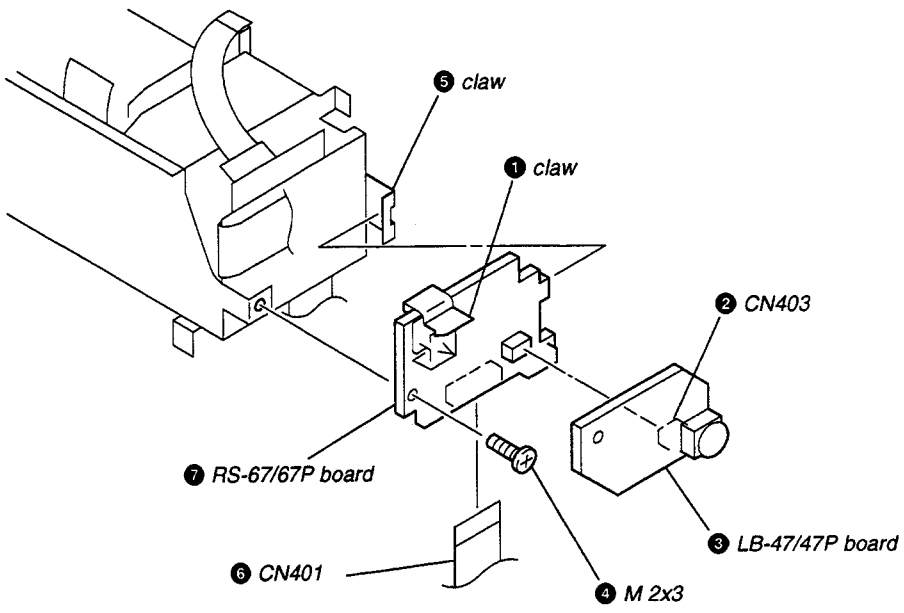
2-12. LD-84/84P BOARD



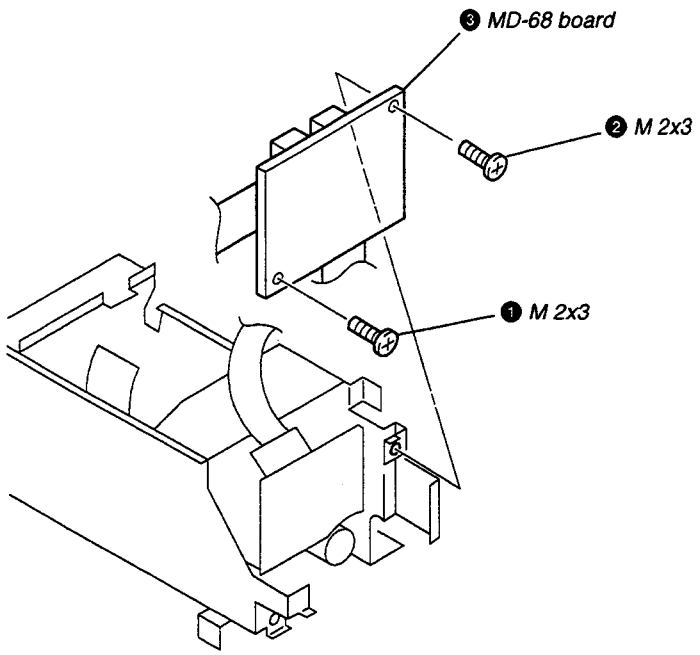
2-13. VC-179 BOARD



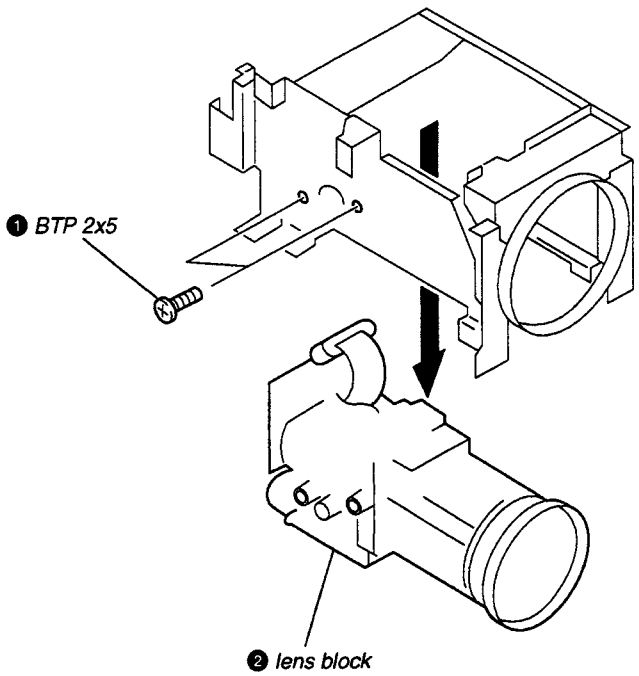
2-14. RS-67/67P BOARD



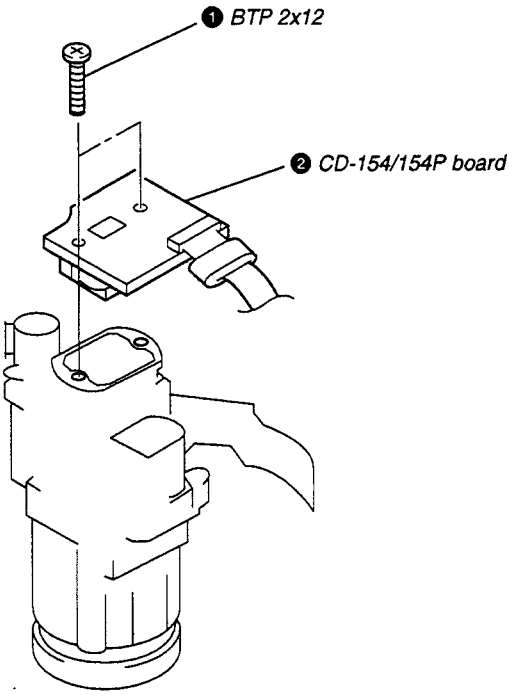
2-15. MD-68 BOARD



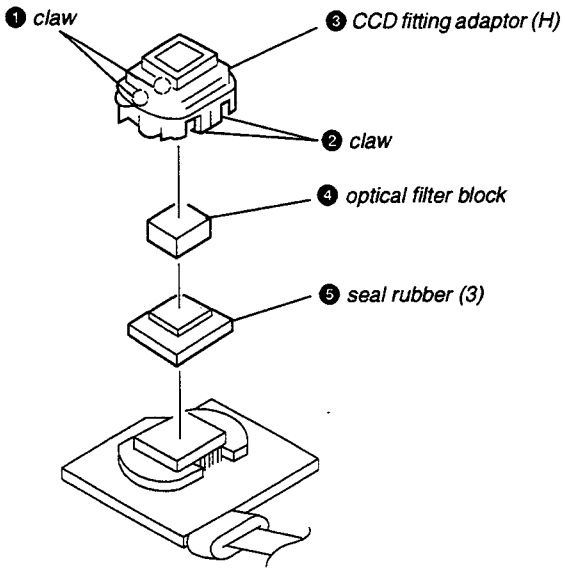
2-16. LENS BLOCK



2-17. CD-154/154P BOARD

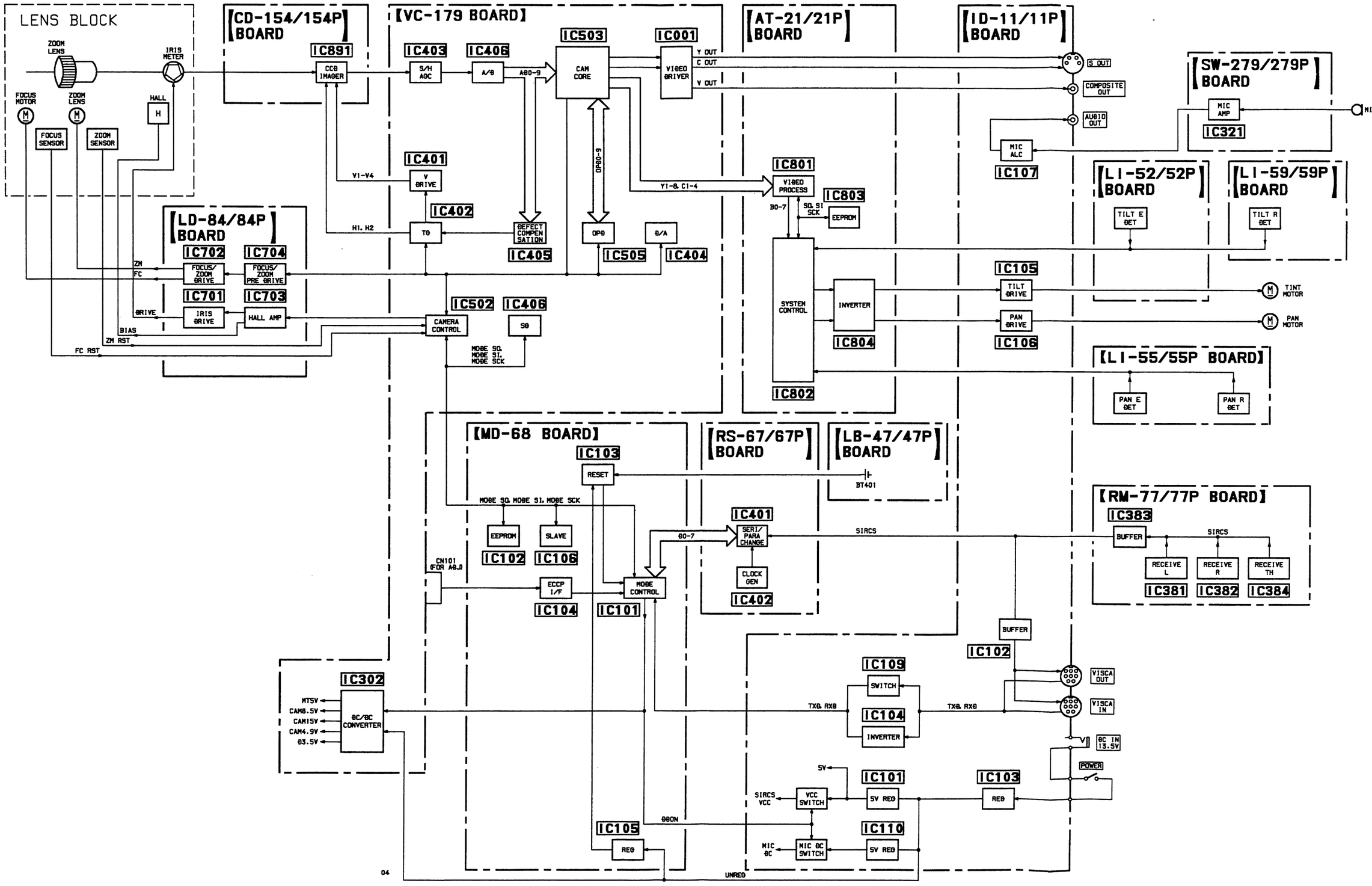


2-18. CCD FITTING ADAPTOR (H)



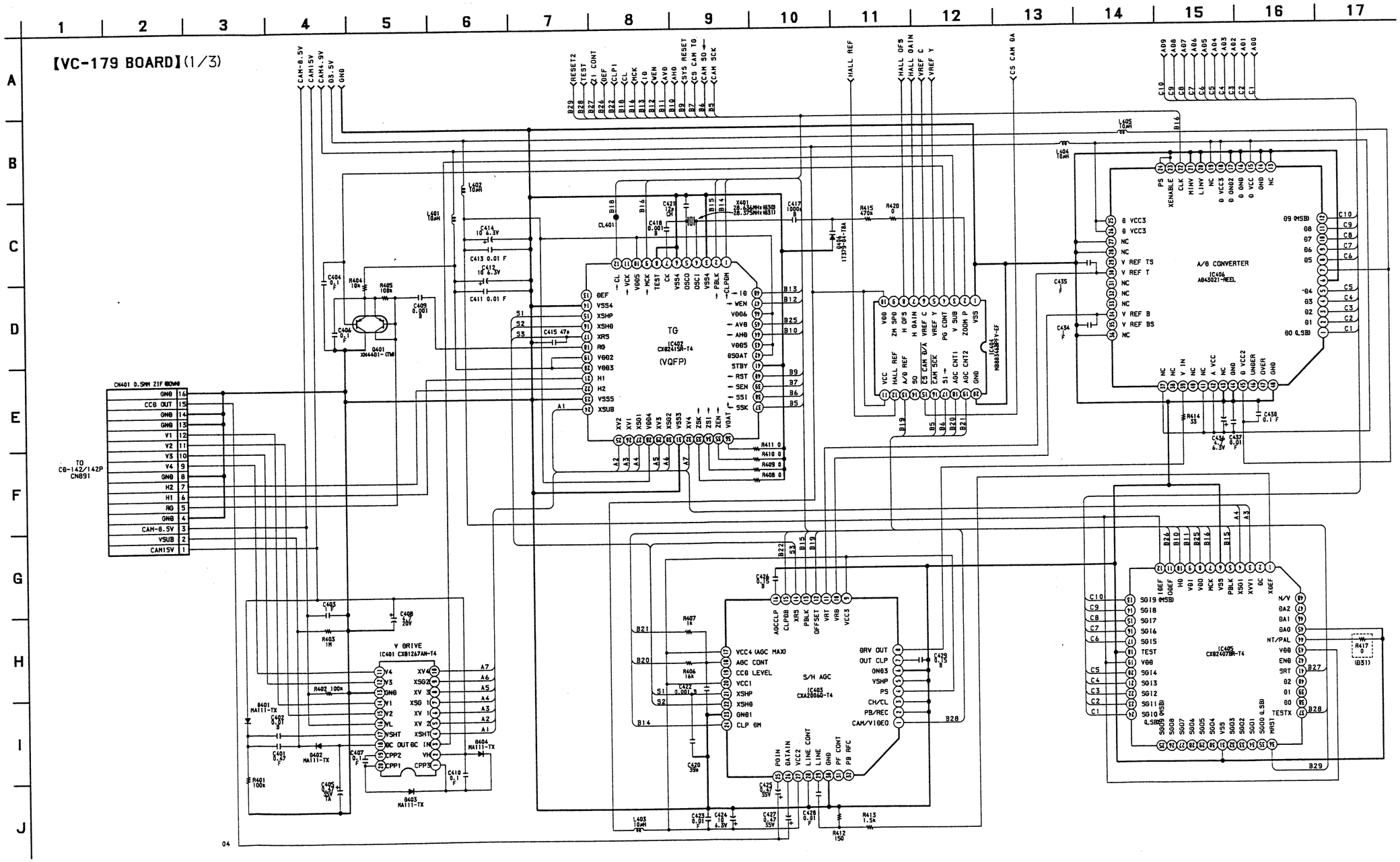
SECTION 3
BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM



VC-179 (CAMERA(1)) SCHEMATIC DIAGRAM

– Ref. No. VC-179 BOARD : 1,000 series –



SECTION 4
SCHEMATIC DIAGRAMS

4-1. SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR SCHEMATIC DIAGRAMS.

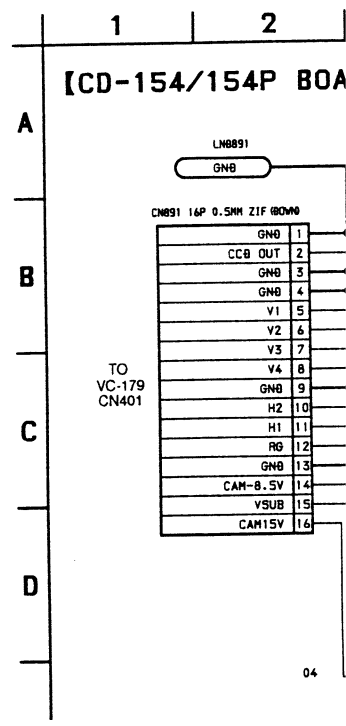
- **For schematic diagrams.**

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor,
  because it is damaged by the heat.
- All resistors are in ohms, 1/4W unless otherwise noted.
- Chip resistor are 1/8W or 1/10W unless otherwise noted.
  k : 1000 Ω, MΩ : 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B,
  unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal componant.

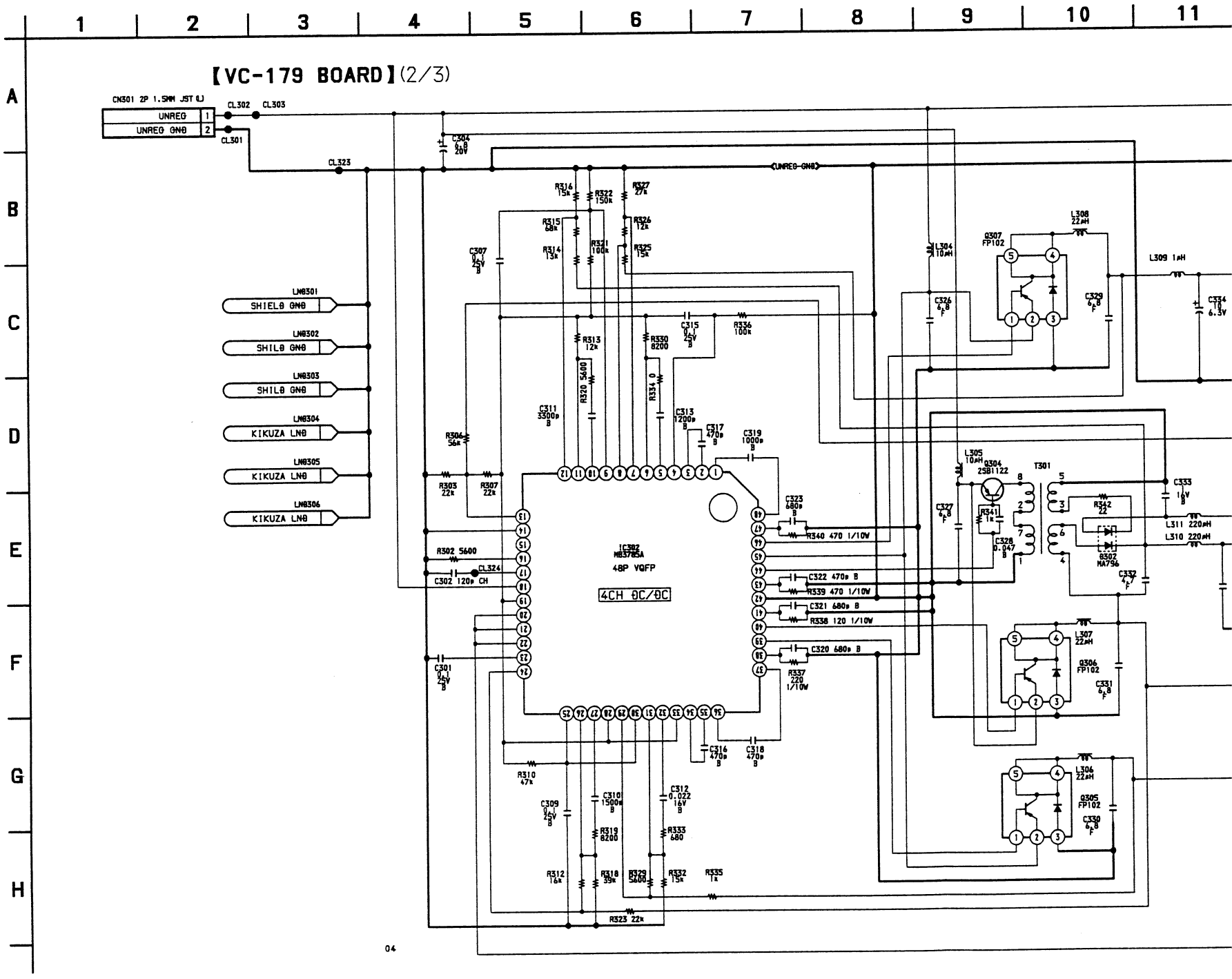
Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by referrence number, please include the board name.

CD-154/154P (CCD IMAGER
– Ref. No. CD-154/154P BOARD



VC-179 (POWER SUPPLY) SCHEMATIC DIAGRAM
– Ref. No. VC-179 BOARD : 1,000 series –



AMS

ATIC DIAGRAMS.

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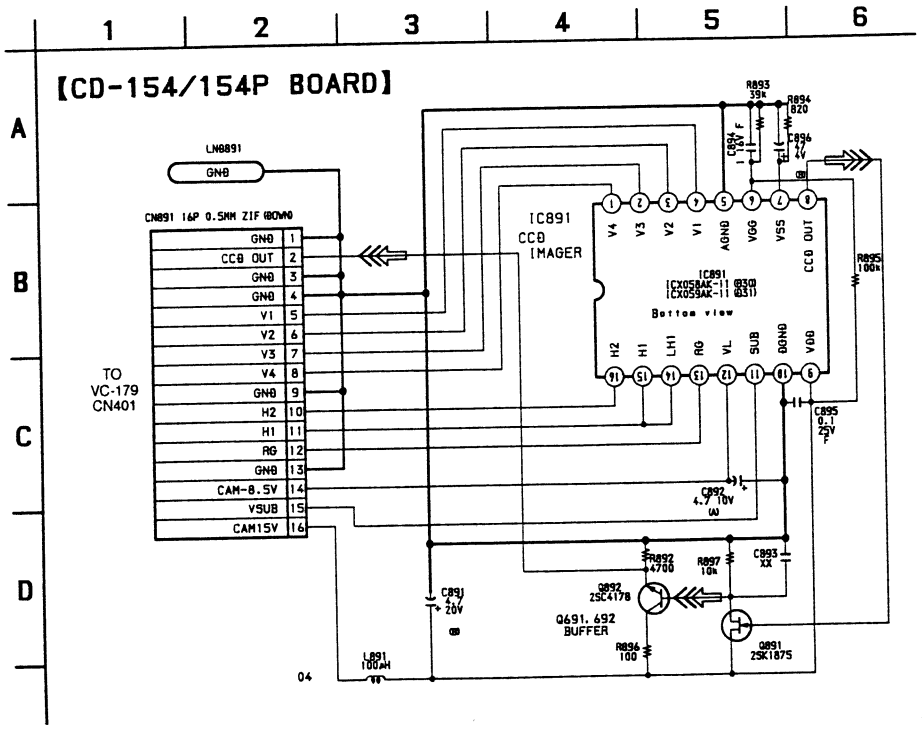
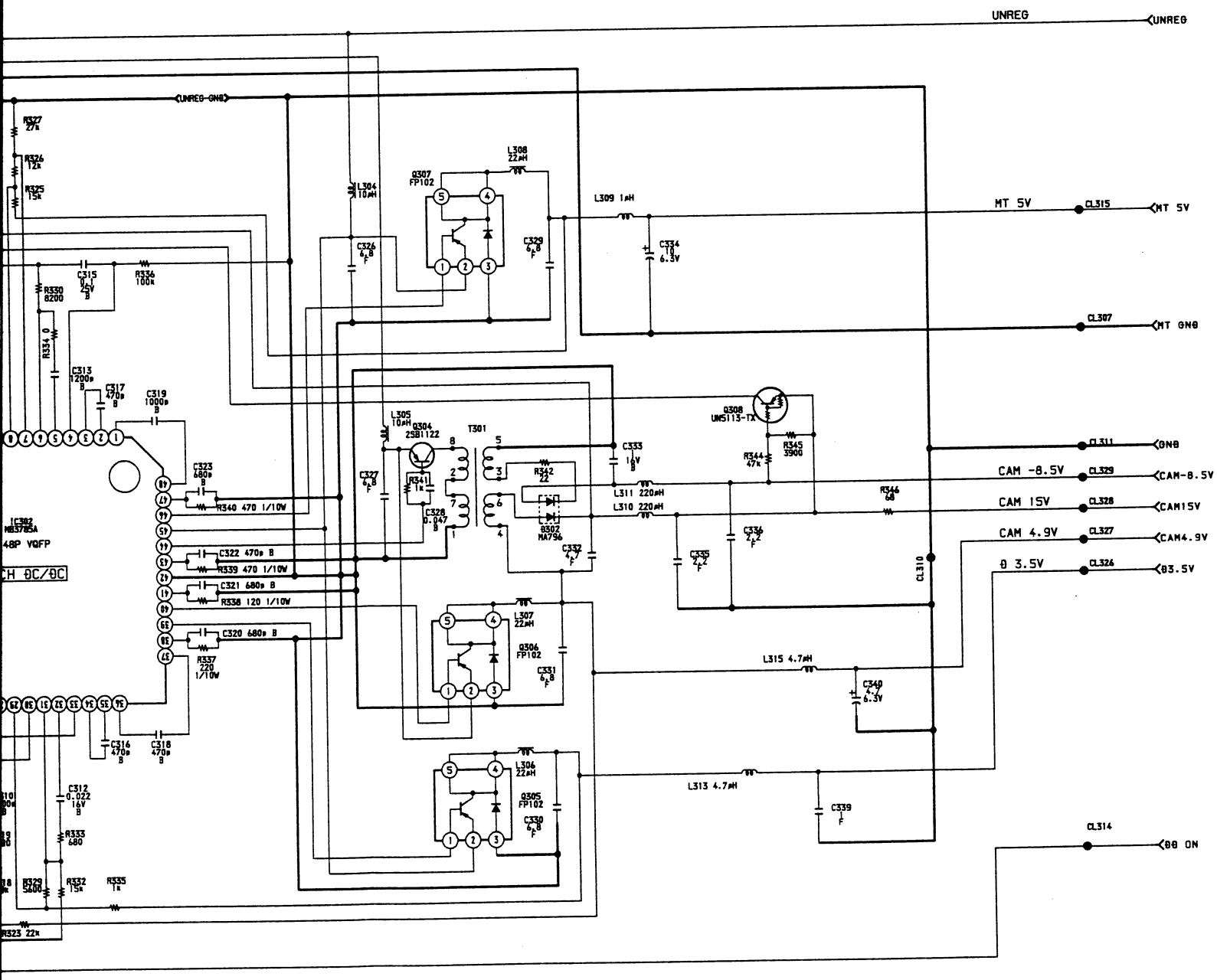
CD-154/154P (CCD IMAGER) SCHEMATIC DIAGRAM

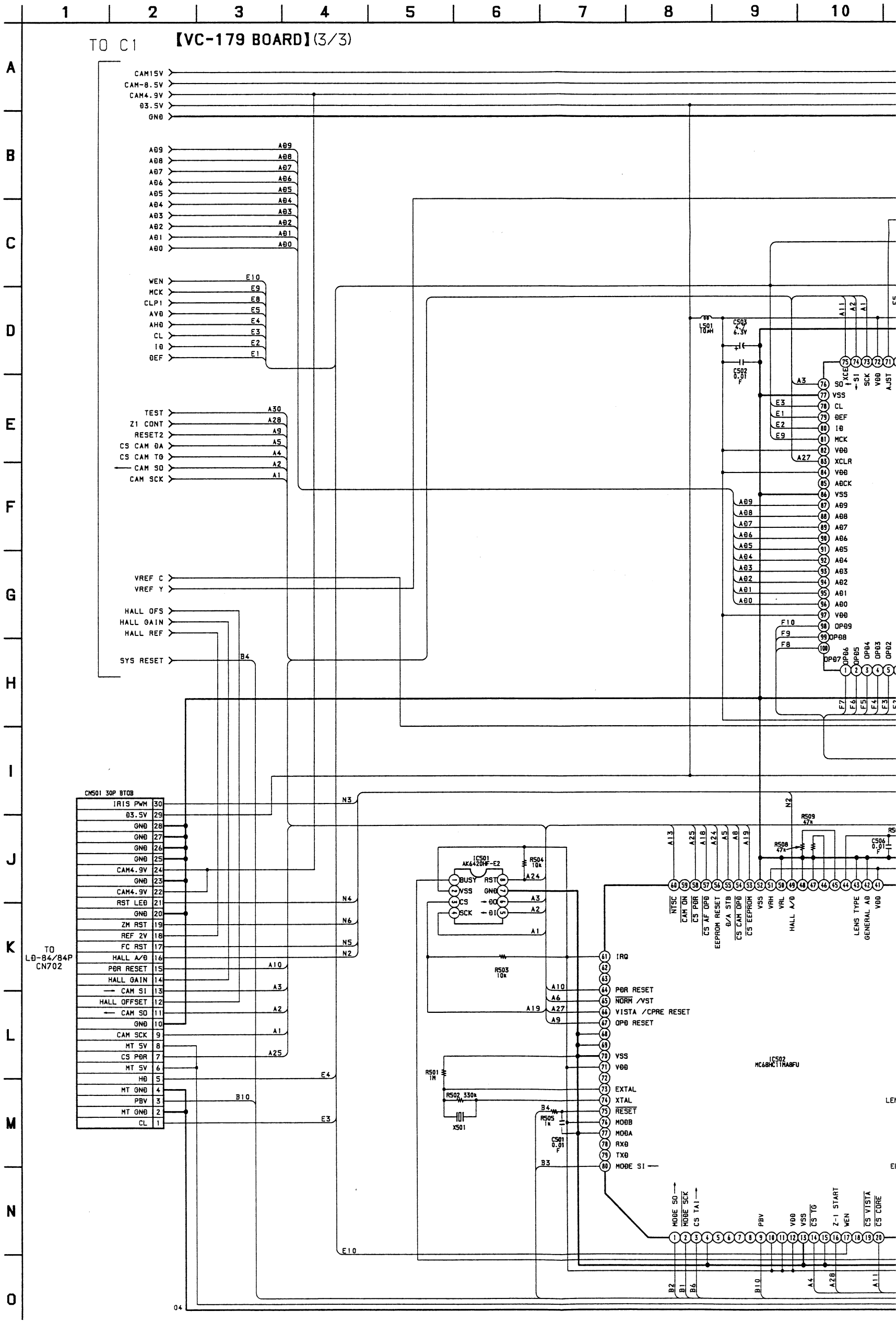
– Ref. No. CD-154/154P BOARD : 1,000 series –

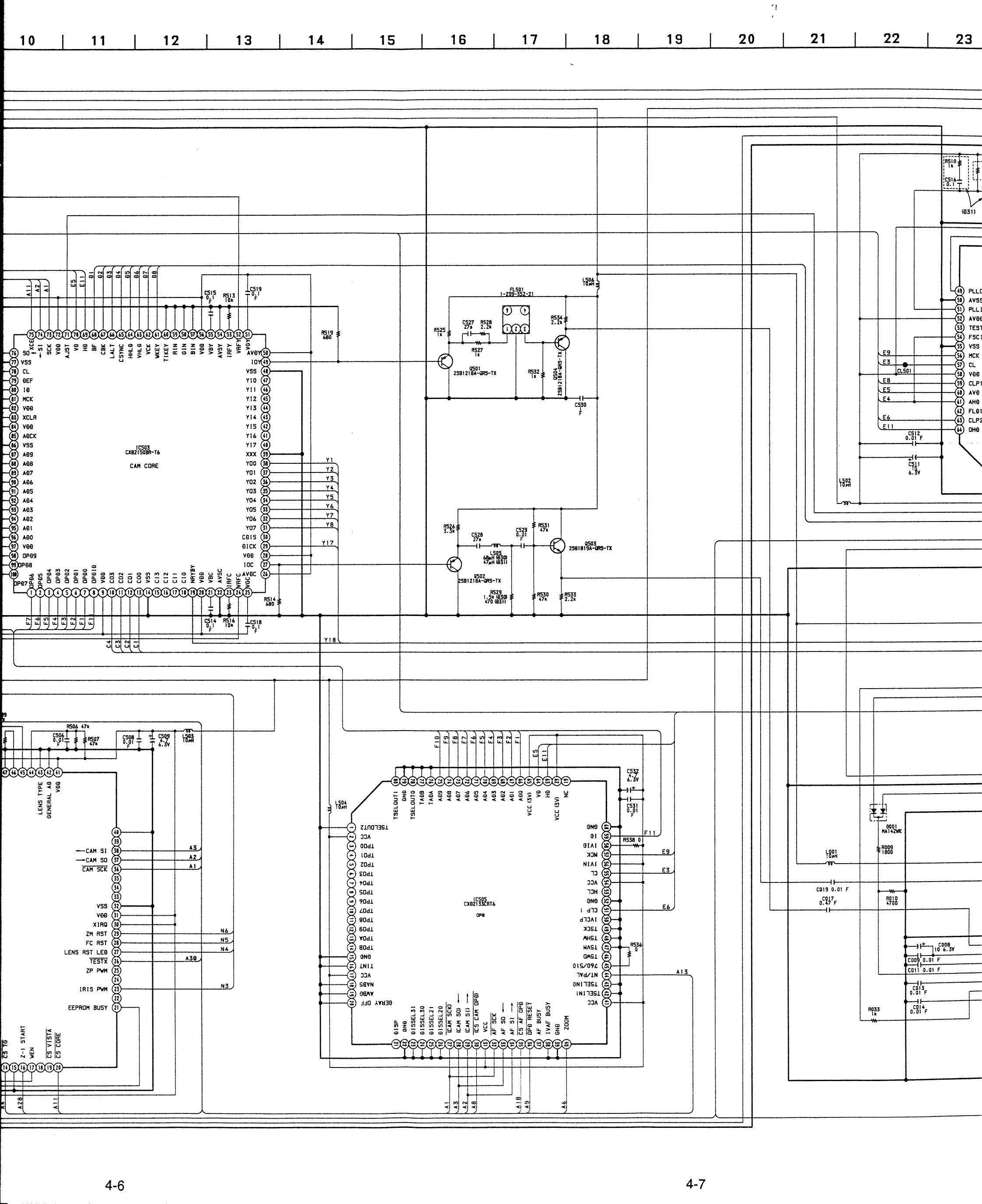




VC-179 (CAMERA(2)) SCHEMATIC DIAGRAM

– Ref. No. VC-179 BOARD : 1,000 series –




10 11 12 13 14 15 16 17 18 19 20 21 22 23
IC503
CX82150BR-T6
CAM CORE
FL501
1-239-352-21
Q501
2SB1218A-QRS-TX
Q502
2SB1218A-QRS-TX
Q503
2SB1819A-QRS-TX
Q504
2SB1218A-QRS-TX
IC505
CX82133CRT6
OP8
CAM SI
CAM SO
CAM SCK
LENS TYPE
GENERAL A0
EEPROM BUSY
LENS RST LE0
ZM RST
FC RST
IRIS PWM
ZP PWM
TESTX
CS VISTA
CS CORE
Z-I START
WEN
CS T6
PLLO
AVSS
PLLI
AV00
TEST
FSCI
VSS
MCK
CL
V00
CLP1
AV0
AH0
FL01
CLP2
OH0
CL501
L501 10uH
L502 10uH
L503 10uH
L504 10uH
L506 10uH
0001 MA142WK
R009 1800
R010 4700
R033 1k
R538 0
R536 0
C019 0.01 F
C017 0.47 F
C008 10 6.3V
C009 0.01 F
C011 0.01 F
C013 0.01 F
C014 0.01 F
C512 0.01 F
C511 6.3V
C530 F
C531 0.01 F
C532 4.7 6.3V
R519 680
R514 680
R506 47k
R507 47k
C506 0.01 F
C508 0.01 F
C509 4.7 6.3V
C515 0.1 F
R513 10k
C519 0.1 F
C514 0.1 F
R516 10k
C518 0.1 F
R510 1k
C516 0.1
(031)

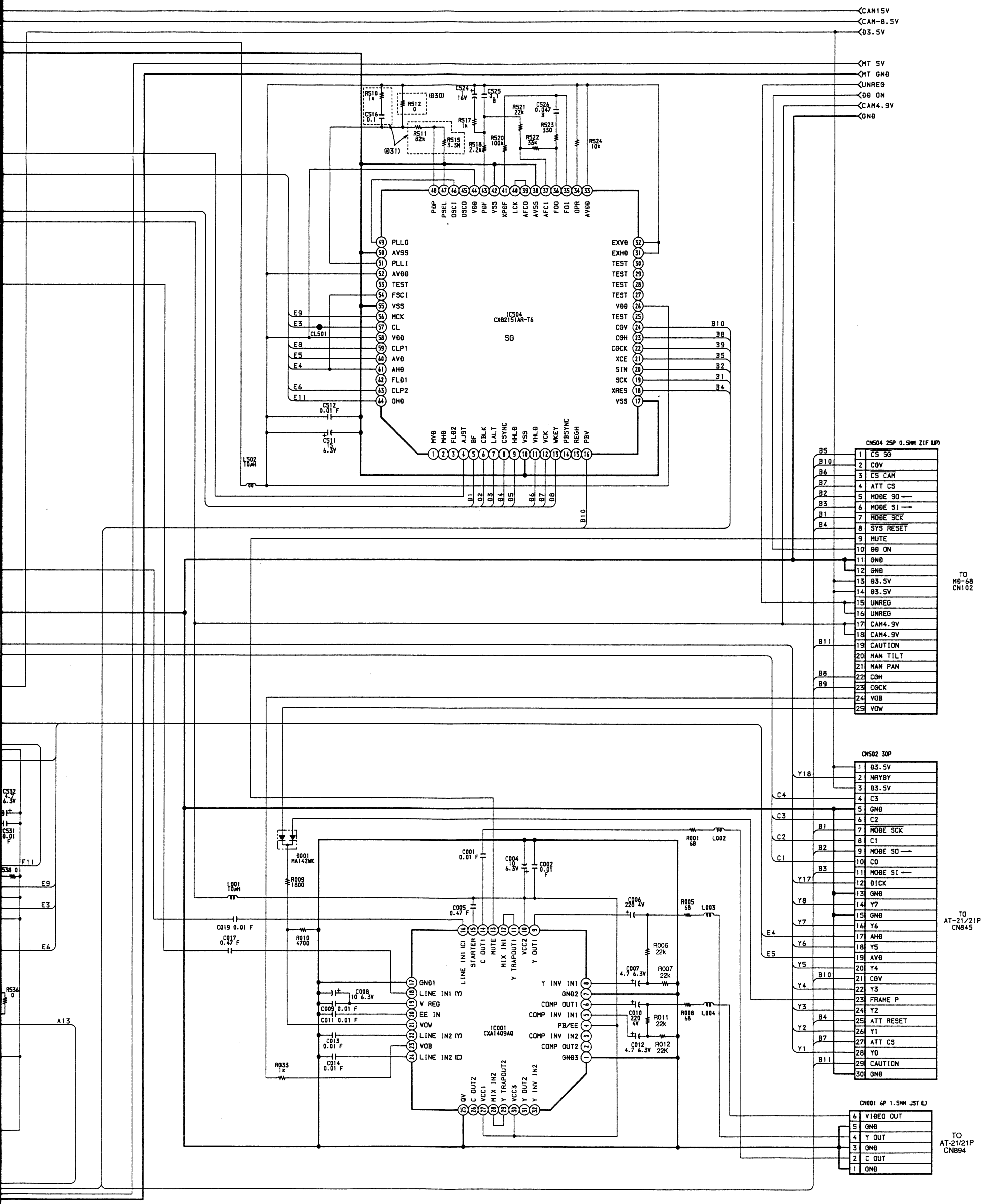
6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19

IC503
CX82150BR-T6
CAM CORE

IC502
MC68HC11MA8FU

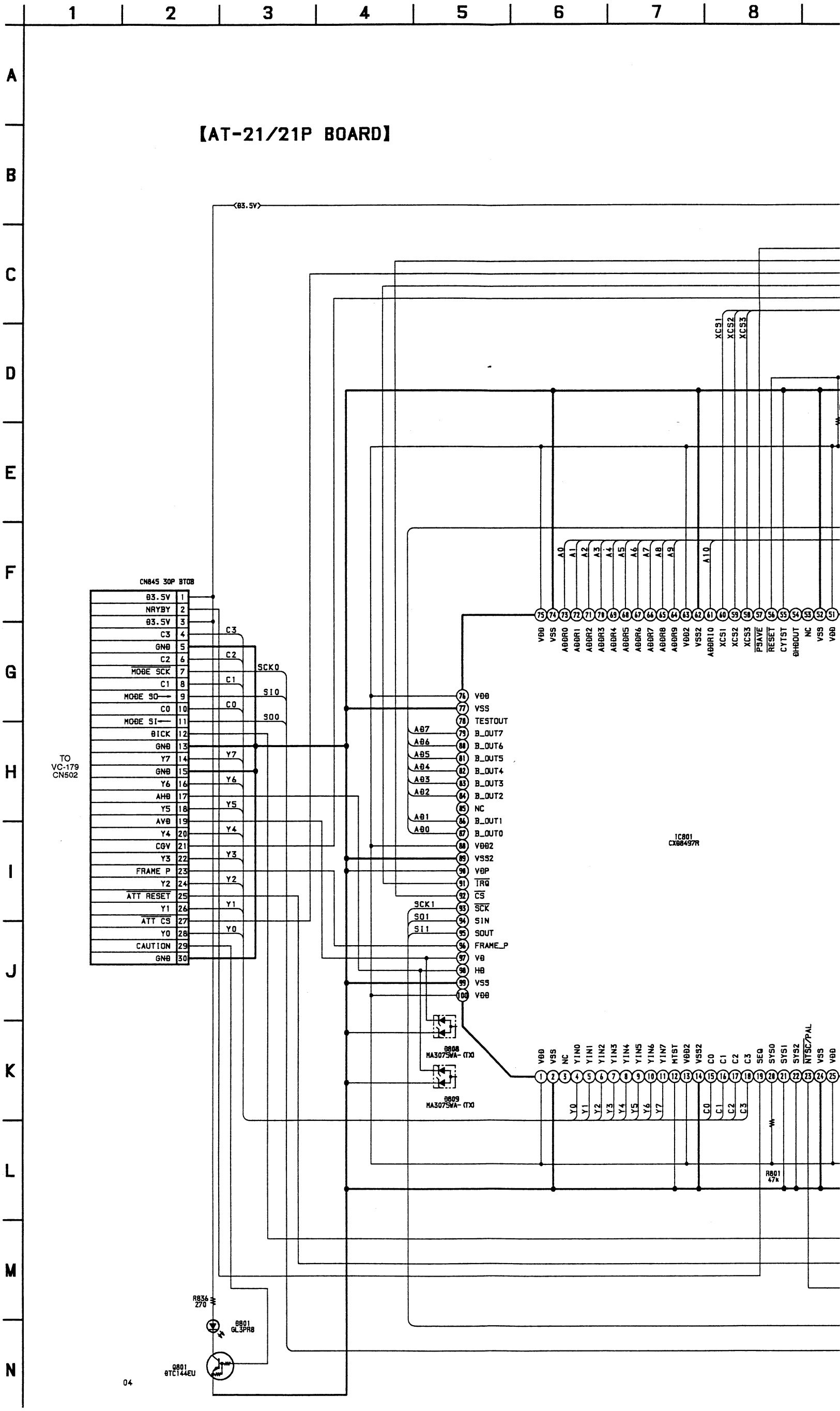
IC505
CX02133CRT6
OPB

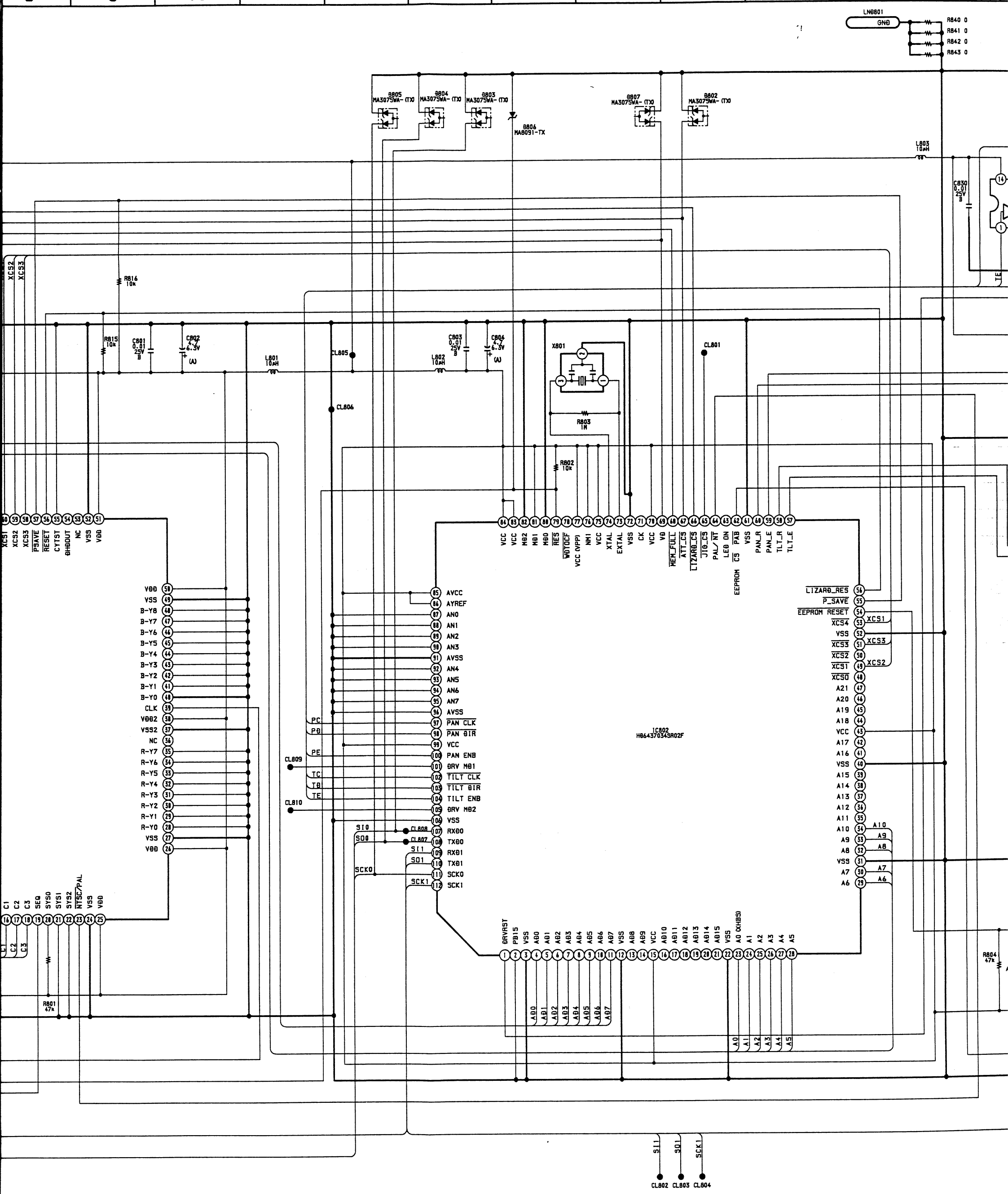
19	20	21	22	23	24	25	26	27	28	29	30



AT-21/21P (VIDEO PROCESS, MAIN CONTROL) SCHEMATIC DIAGRAM

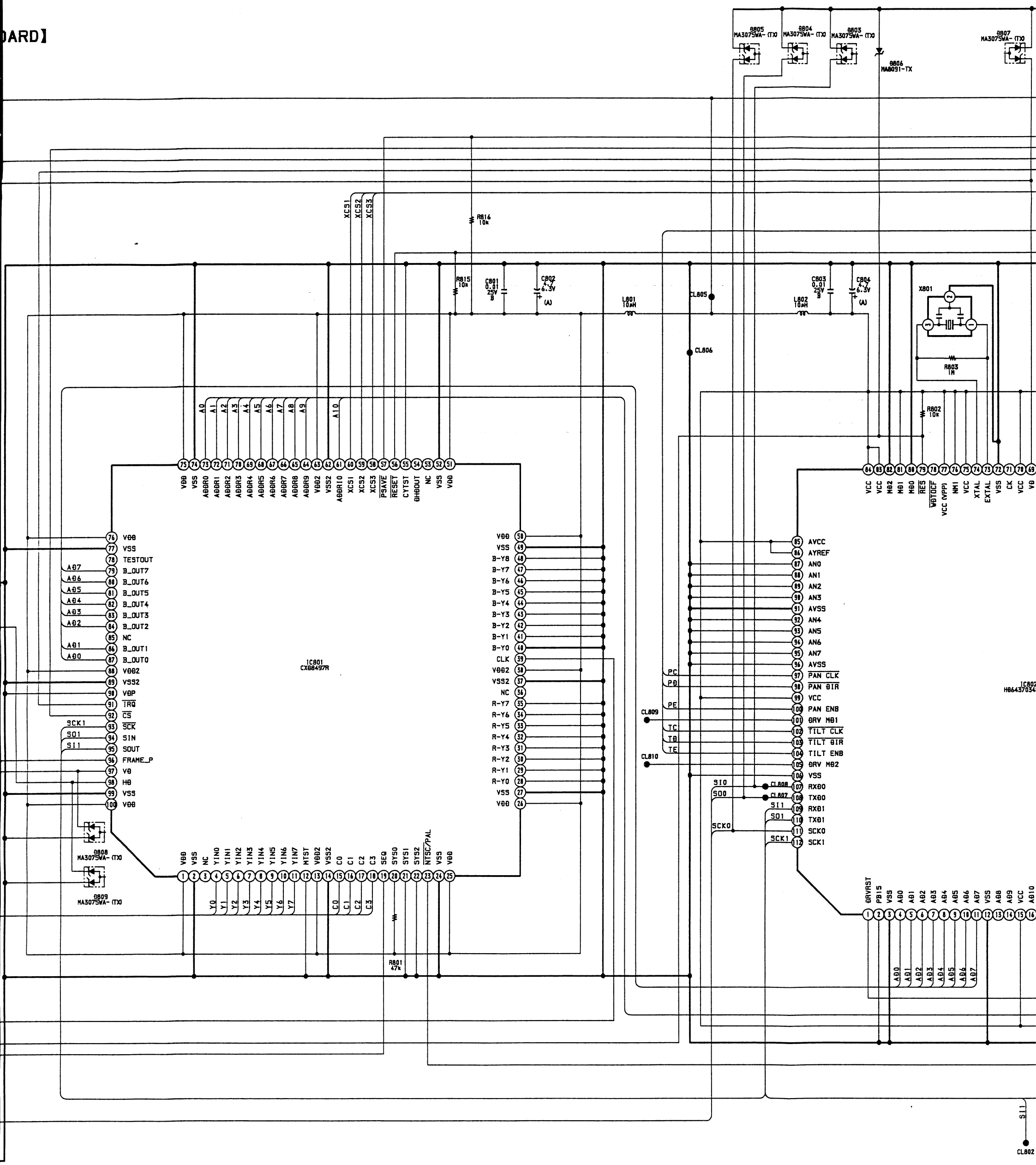
– Ref. No. AT-21/21P BOARD : 1,000 series –



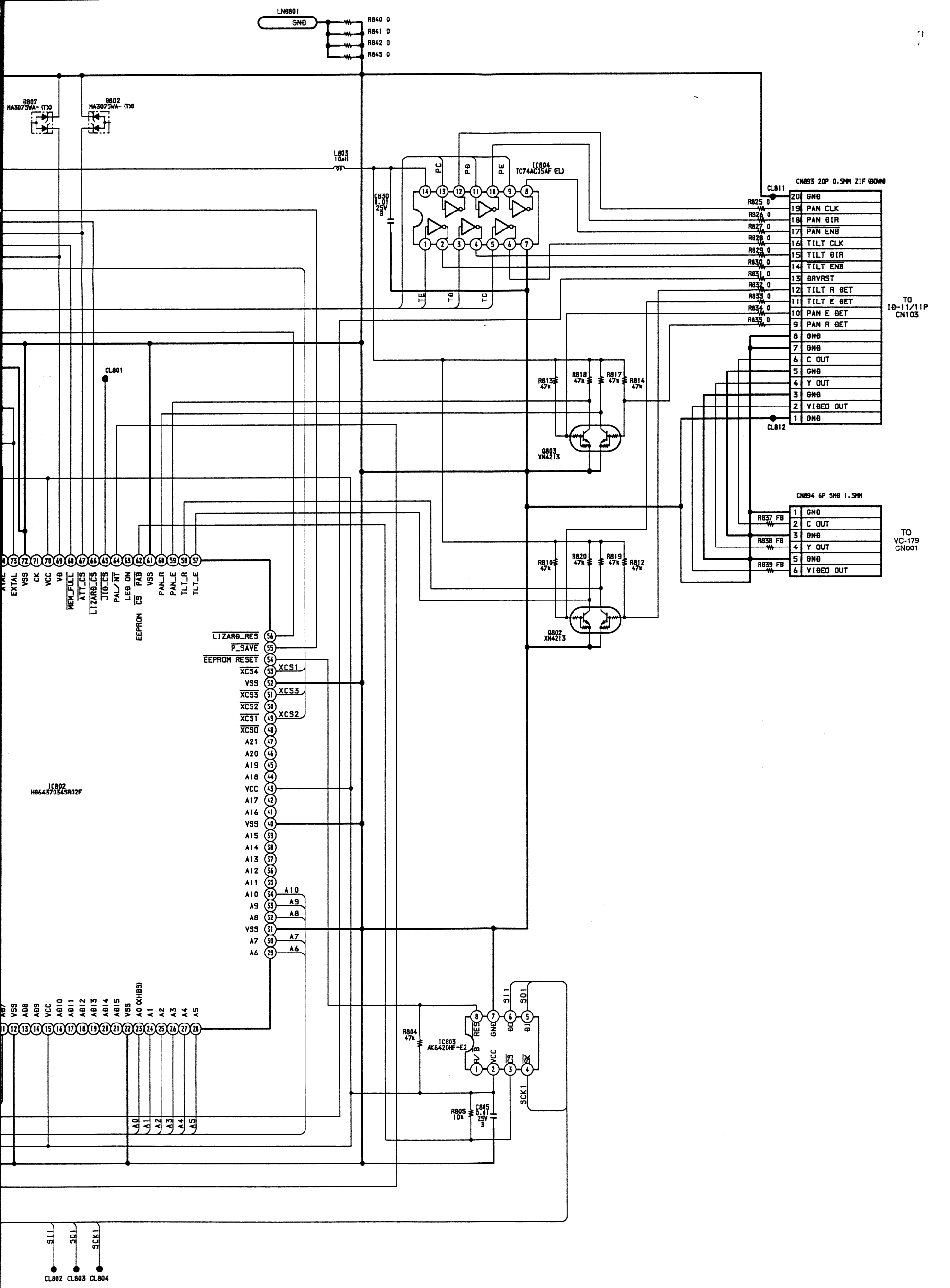

LN8801
GND
R840 0
R841 0
R842 0
R843 0
Q805 MA3075WA-(TX)
Q804 MA3075WA-(TX)
Q803 MA3075WA-(TX)
Q806 MA8091-TX
Q807 MA3075WA-(TX)
Q802 MA3075WA-(TX)
L803 10μH
C830 0.01 25V B
R816 10k
C801 0.01 25V B
C802 4.7 6.3V (A)
L801 10μH
CL805
C803 0.01 25V B
C804 4.7 6.3V (A)
L802 10μH
X801
CL801
CL806
R803 1M
R802 10k
XCS1
XCS2
XCS3
PSAVE
RESET
CYTST
ØHØOUT
NC
VSS
VØØ
VCC VCC MØ2 MØ1 MØØ RES WDTOCF VCC(VPP) NM1 VCC XTAL EXTAL VSS CK VCC VØ HEM_FULL ATT_CS LIZARØ_CS JIØ_CS PAL/NT LEØ ON EEPROM CS PAB VSS PAN_R PAN_E TLT_R TLT_E
VØØ VSS B-Y8 B-Y7 B-Y6 B-Y5 B-Y4 B-Y3 B-Y2 B-Y1 B-Y0 CLK VØØ2 VSS2 NC R-Y7 R-Y6 R-Y5 R-Y4 R-Y3 R-Y2 R-Y1 R-Y0 VSS VØØ
AVCC AYREF AN0 AN1 AN2 AN3 AVSS AN4 AN5 AN6 AN7 AVSS PAN CLK PAN ØIR VCC PAN ENB ØRV MØ1 TILT CLK TILT ØIR TILT ENB ØRV MØ2 VSS RXØ0 TXØ0 RX01 TX01 SCK0 SCK1
PC PØ PE TC TØ TE
CL809 CL810
SIØ SOØ SI1 SO1 SCK0 SCK1
CL808 CL807
IC802
H864370343R02F
LIZARØ_RES P_SAVE EEPROM RESET XCS4 VSS XCS3 XCS2 XCS1 XCSØ A21 A20 A19 A18 VCC A17 A16 VSS A15 A14 A13 A12 A11 A10 A9 A8 VSS A7 A6
C1 C2 C3 SEQ SYSØ SYS1 SYS2 NTSC/PAL VSS VØØ
R801 47k
ØRVRST PB15 VSS AØØ AØ1 AØ2 AØ3 AØ4 AØ5 AØ6 AØ7 VSS AØ8 AØ9 VCC AØ10 AØ11 AØ12 AØ13 AØ14 AØ15 VSS AØ ØKHBSI A1 A2 A3 A4 A5
R804 47k
SI1 SO1 SCK1
CL802 CL803 CL804

4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15

DARD】

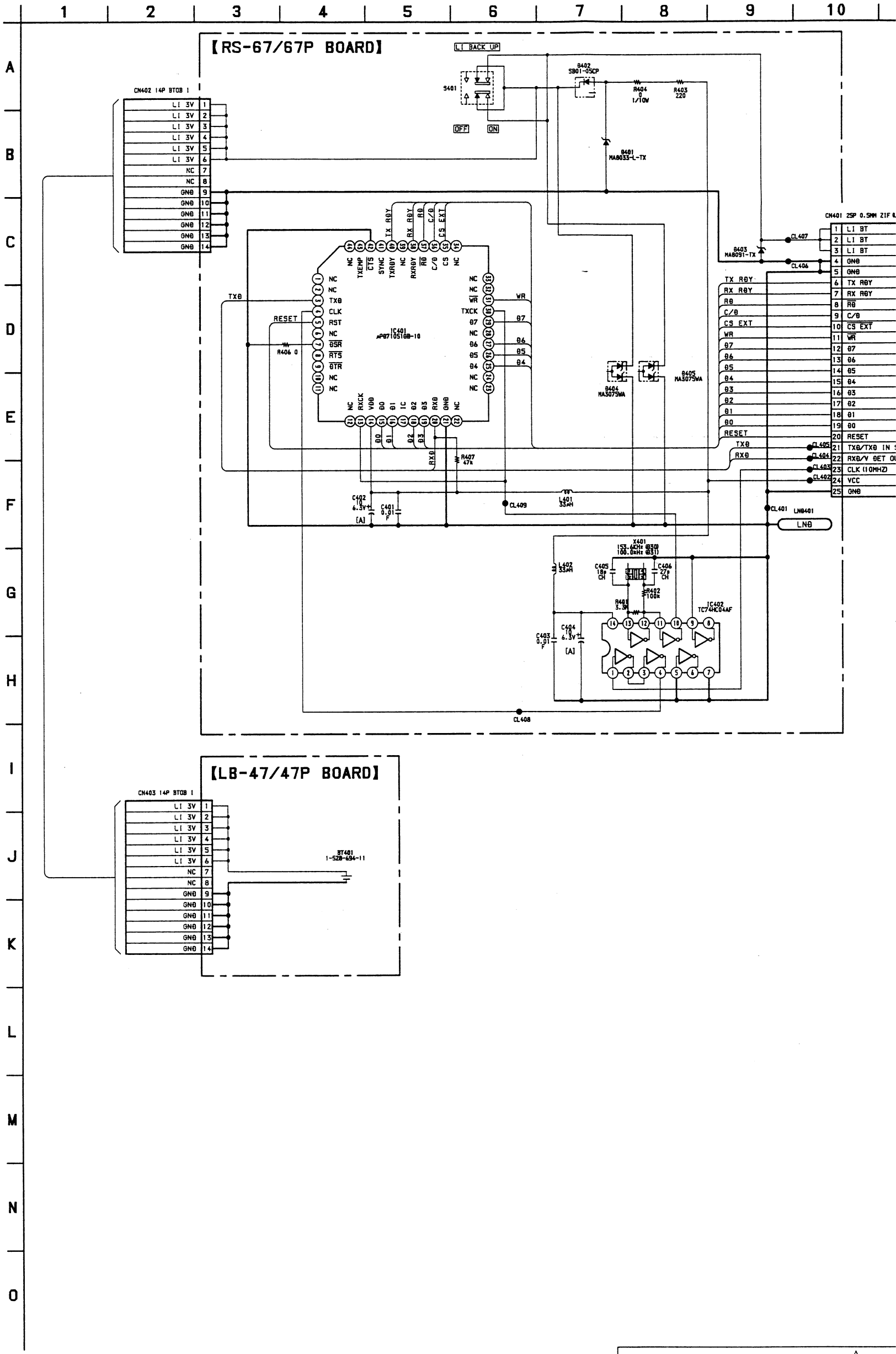


15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25



RS-67/67P (BACK UP) LB-47/47P (BATTERY) MD-68 (MODE CONTROL) SCHEMATIC DIAGRAMS

– Ref. No. RS-67/67P BOARD : 2,000 series, LB-47/47P BOARD : 2,000 series, MD-68 BOARD : 1,000 series –



Note: The components identified by mark ⚠ or do
line with mark ⚠ are critical for safety.
Replace only with part number specified.

10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23

【MD-68 BOARD】

CN401 25P 0.5MM ZIF (UP)

CL407	1	LI BT
	2	LI BT
	3	LI BT
CL406	4	GND
	5	GND
	6	TX R8Y
	7	RX R8Y
	8	R8
	9	C/8
	10	CS EXT
	11	WR
	12	87
	13	86
	14	85
	15	84
	16	83
	17	82
	18	81
	19	80
	20	RESET
CL405	21	TX8/TX8 IN SEL
CL404	22	RX8/V 8ET OUT
CL403	23	CLK (10MHZ)
CL402	24	VCC
	25	GND

LN8401 — LN8

CN106 25P 0.5MM ZIF (BOTTOM)

LI BT	1	
LI BT	2	
LI BT	3	
GND	4	
GND	5	
TX R8Y	6	TX R8Y
RX R8Y	7	RX R8Y
R8	8	R8
C/8	9	C/8
CS EXT	10	CS EXT
WR	11	WR
87	12	87
86	13	86
85	14	85
84	15	84
83	16	83
82	17	82
81	18	81
80	19	80
RESET	20	RESET
TX8/TX8 IN SEL	21	
RX8/V 8ET OUT	22	
CLK (10MHZ)	23	
VCC	24	
GND	25	

CN105 20P 0.5MM ZIF (BOTTOM)

GND	20	
GND	19	
GND	18	
UNREG	17	
UNREG	16	
UNREG	15	
88 ON	14	
RX8	13	
TX8	12	
TX8 IN SEL	11	
VISCA OUT 8ET	10	
SIRCS SW	9	
K A8 IN 3	8	
K A8 IN 4	7	
SIRCS LE8	6	
SIRCS 2	5	CL112
SIRCS 1	4	CL111
MUTE	3	
M8 CAUTION/E	2	
GND	1	

TO I8-11/11P CN104

CN102 25P 0.5MM ZIF (BOTTOM)

CS 5G	1	CL116
CGV	2	
CS CAM	3	CL117
ATT CS	4	CL118
M08E SO—	5	CL119
M08E SI—	6	CL120
M08E SCK	7	CL121
SYS RESET	8	CL122
MUTE	9	CL123
88 ON	10	CL124
GND	11	CL125
GND	12	
83.5V	13	CL126
83.5V	14	
UNREG	15	CL127
UNREG	16	
CAM4.9V	17	CL128
CAM4.9V	18	
CAUTION LE8	19	CL129
MANU TILT	20	
MANU PAN	21	
CGH	22	
CGCK	23	
VOB	24	
VOW	25	

TO VC-179 CN504

CN101 3P 1.5MM JST (L)

ECCP 8C	1	CL133
ECCP SIG	2	CL134
ECCP GND	3	CL135

R144 0, R145 0, IC105 PQ20VZ5U, PS101 CCP2E20 0.8A, CL115, C112 10 10V (A), C113 10 6.3V (A), R127 12k, R128 2700, CL114

LN8101 — LN8 — D110 MA8091-TX — R101 0 1/10W

LN8102 — LN8

R142 0

TX R8Y, RX R8Y, R8, C/8, CS EXT, WR, 87, 86, 85, 84, 83, 82, 81, 80, RESET

CS 5G, CGV, CS TAI, CS ATT, SLAVE, MASTER, SCK, RST, CGH

EVER 8C FILTER

L101 33uH, C113 10 6.3V (A), C114 0.01 F, R131 47k, C115 4700p B

XTL101 10MHZ, CL101

C127 22p CH, C128 18p CH, X101 32KHz, R140 330k, R189 1k, R188 1k

1	M08 0	TEST M08E 0 (GND)
2	M08 1	TEST M08E 1 (GND)
3	X0	X0 (10MHz)
4	X1	X1 (10MHz)
5	VSS	VSS
6	XRST	RESET
7	P00/E120	80
8	P01/E121	81
9	P02/E122	82
10	P03/E123	83
11	P04/E124	84
12	P05/E125	85
13	P06/E126	86
14	P07/E127	87
15	P10/E110	BATT IN
16	P11/E111	PBV
17	P12/E112	RX R8Y
18	P13/E113	TX R8Y
19	P14	LI PRE EN8
20	P15	EEPROM WE
21	P16	POWER SW
22	P17	LANC POWER ON
23	P20	POWER LE8
24	P21	SYSTEM RESET
25	P22	AF LE8
26	CMC8	
27	P24/S10	LE8 POSITION 3
28	P25/S00	LE8 POSITION 4
29	P26/SCK0	LE8 POSITION 5
30	P27/RMC1	SIRCS IN
31	P30/SE031	M8 CAUTION/STEADY SHOT SW
32	P31/SE030	VISCA OUT 8ET
33	P32/SE029	CS EEPROM
34	P33/SE028	CS EXT
35	P34/SE027	CS ATT
36	P35/SE026	CS 5G
37	P36/SE025	EXT RESET
38	AVCC	
39	(AVCC) VCC	
40	P37/AN07	K A8 IN 7
41	K A8 IN 10	
42	TX8 IN SEL	
43	BATT 8DWN	
44	PA0/AN08	
45	PA1/AN09	
46	PA2/AN10	
47	PA3/AN11	
48	MUTE	
49	ECCP IN	
50	PA4/LS1	
51	PA5/LS0	
52	PA6/CDUT	
53	VCC	
54	CL1 (32KHZ)	
55	CL0 (32KHZ)	

R151 0, R152 0, R153 0, R154 0, R155 0, R156 0, R157 0, R158 0, R159 0, R160 0

CGV, RX R8Y, TX R8Y, RST, AF LE8, CAUTION LE8, SIRCS LE8

R167 1k, C103 0.01 F, D108 MA8091-TX, R115 470, R116 1k, R111 47k, Q104 BTC144EU, R110 150

R113 18k, R112 18k, D104 MA142WK-TX, R114 330k

C131 0.01 F, C132 0.01 F

C102 0.1 25V F, EEPROM, IC102 AK6420HF-E2, R108 100k, CS EEPROM, SCK, SLAVE, MASTER

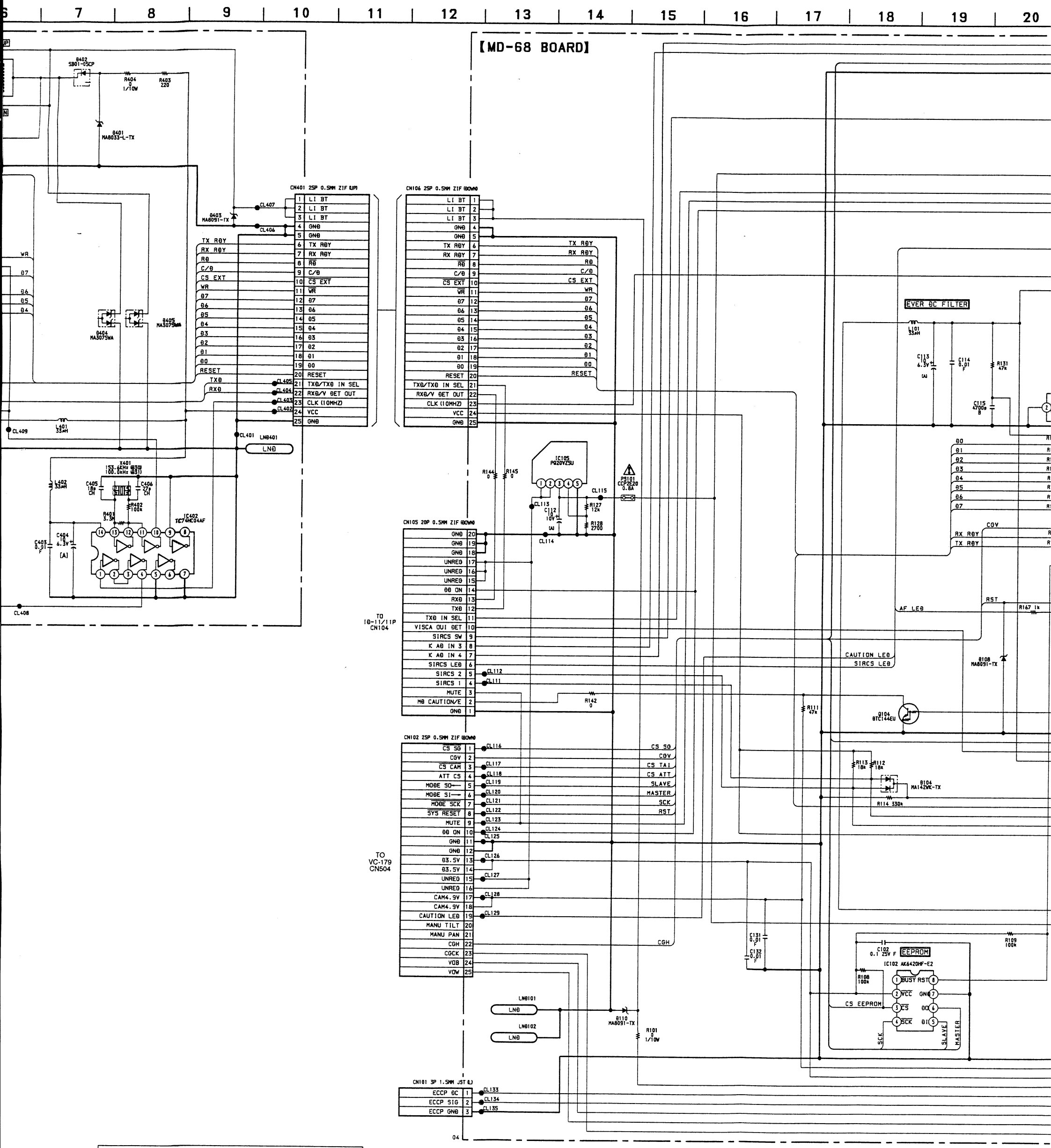
IC103 S-84230FS-T2, R117 1k, CL104, CL105, CL106, D109 MA8091-TX, R109 100k, R118 100k, R119 100k, <EVER3.6V>, C104 5 6.3V (A)

MODECO

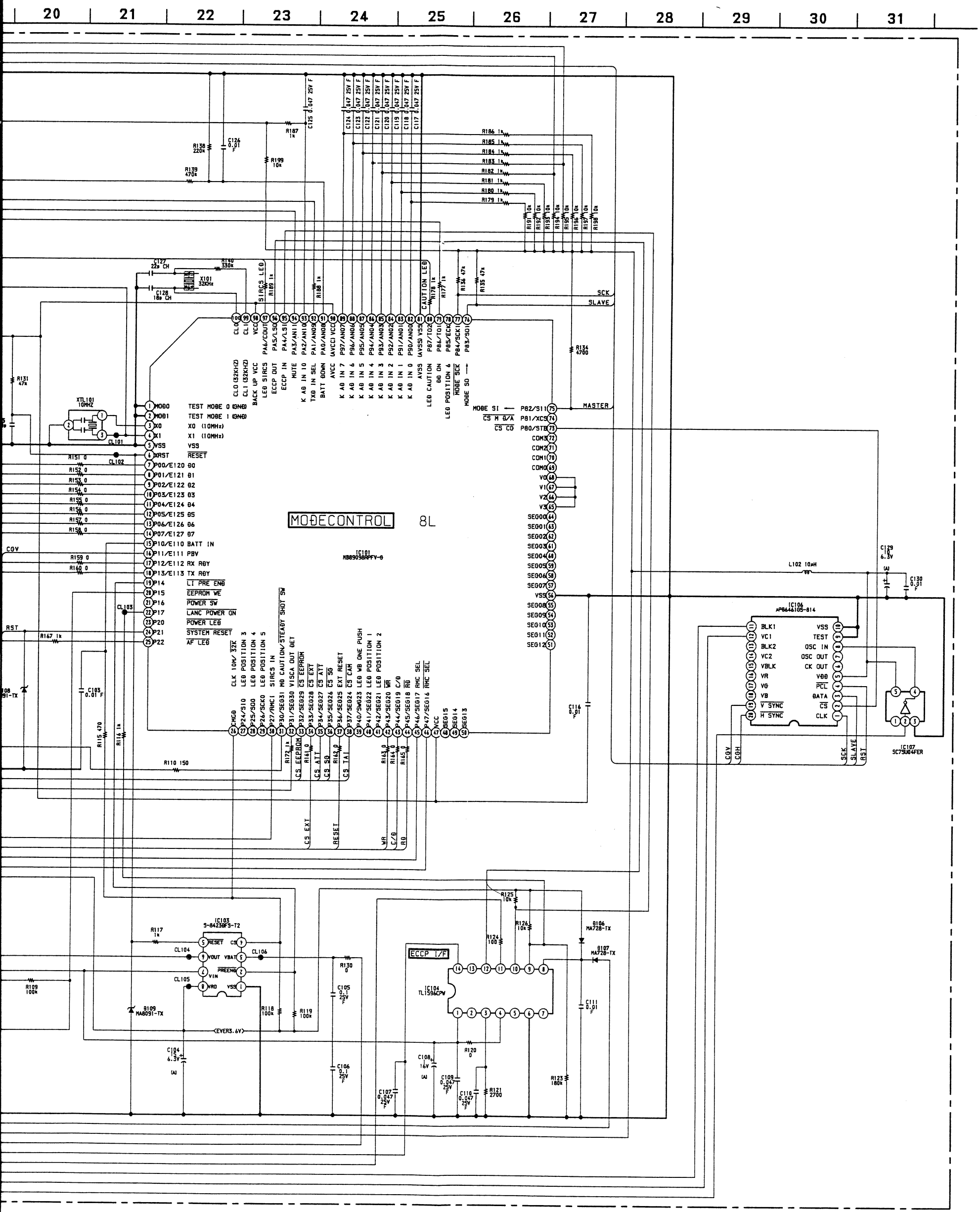
ed by mark ⚠ or dotted
tical for safety.
mber specified.

SCHEMATIC DIAGRAMS

– BOARD : 1,000 series –

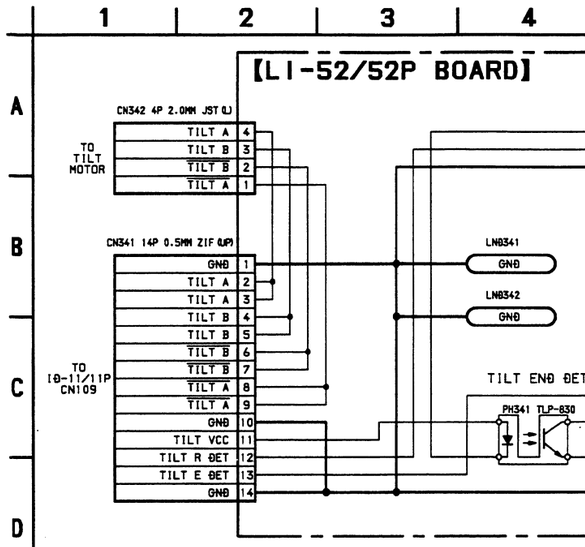


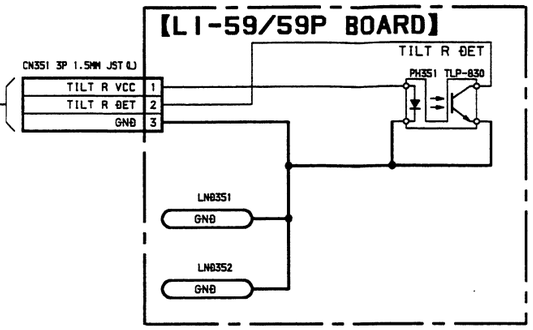
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

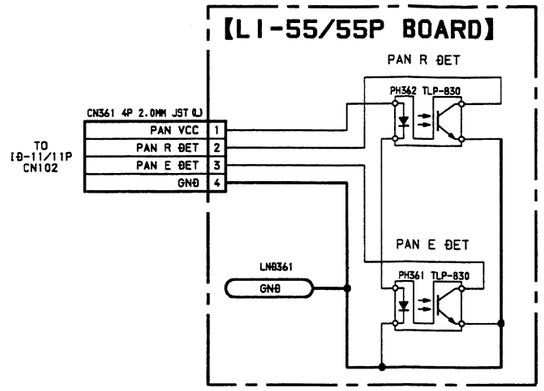

20
21
22
23
24
25
26
27
28
29
30
31
MODECONTROL
8L
IC101
MB89058RPFV-G
TEST MODE 0 (GND)
TEST MODE 1 (GND)
XO (10MHz)
X1 (10MHz)
VSS
RESET
BATT IN
PBV
RX RDY
TX RDY
LI PRE END
EEPROM WE
POWER SW
LANC POWER ON
POWER LED
SYSTEM RESET
AF LED
SCK
SLAVE
MASTER
CAUTION LED
SIRCS LED
L102 10uH
IC106
AP8646105-814
IC107
SC75U04FER
IC103
S-84230F3-T2
IC104
TL1596CPW
ECCP I/F
<EVER3.6V>
CS EXT
RESET
WR
C/D
A0

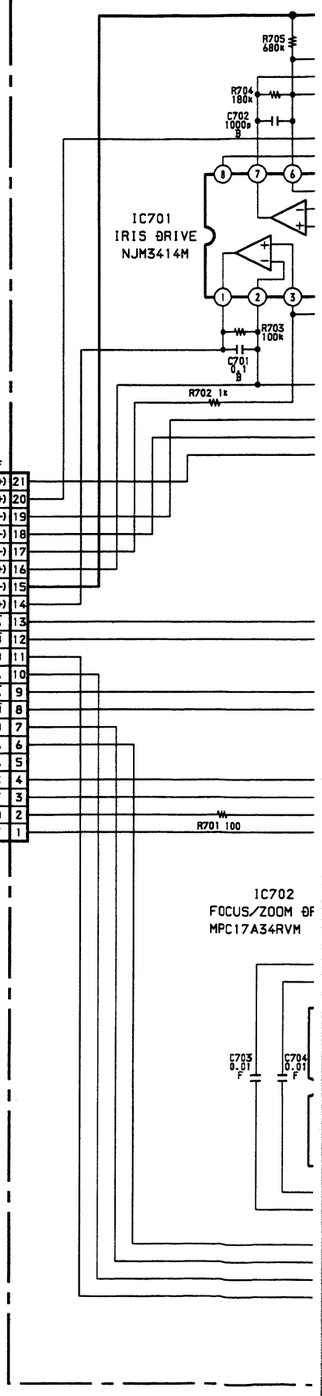
LI-52/52P (TILT END SENSOR) LI-55/55P (PAN R SENSOR) LI-59/59P (TILT R SENSOR) LD-84/84P (LENS DRIVE) RM-77/77P (SIRCS RECEIVE) SW-279/279P (MIC AMP) SCHEMATIC DIAGRAMS

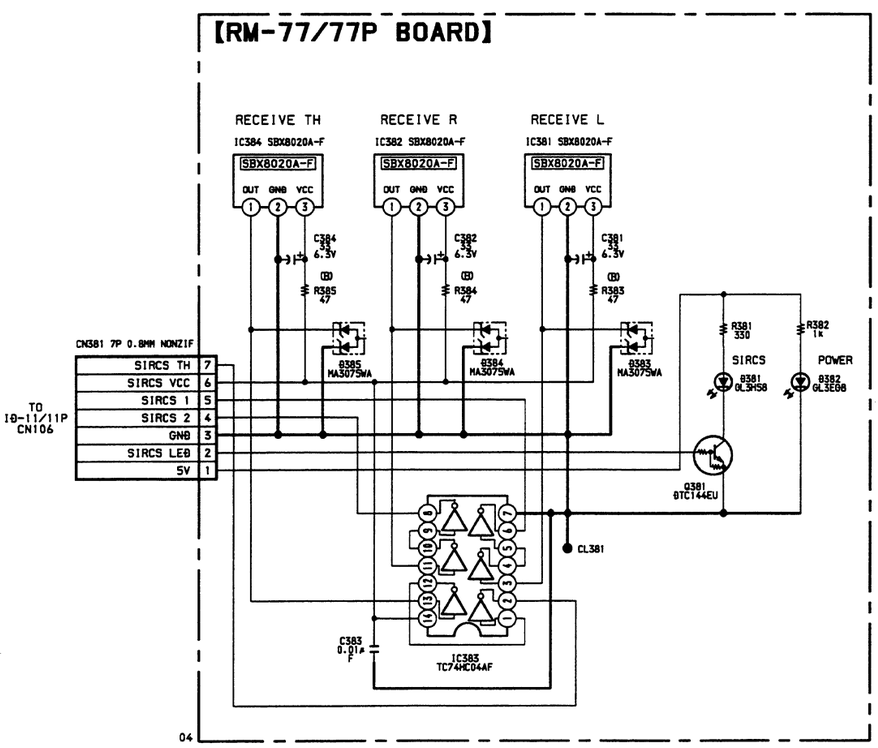
– Ref. No. LI-52/52P BOARD : 2,000 series, LI-55/55P BOARD : 2,000 series, LI-59/59P BOARD : 2,000 series, LD-84/84P BOARD : 2,000 series, RM-77/77P BOARD : 2,000 series, SW-279/279P BOARD : 2,000 series –

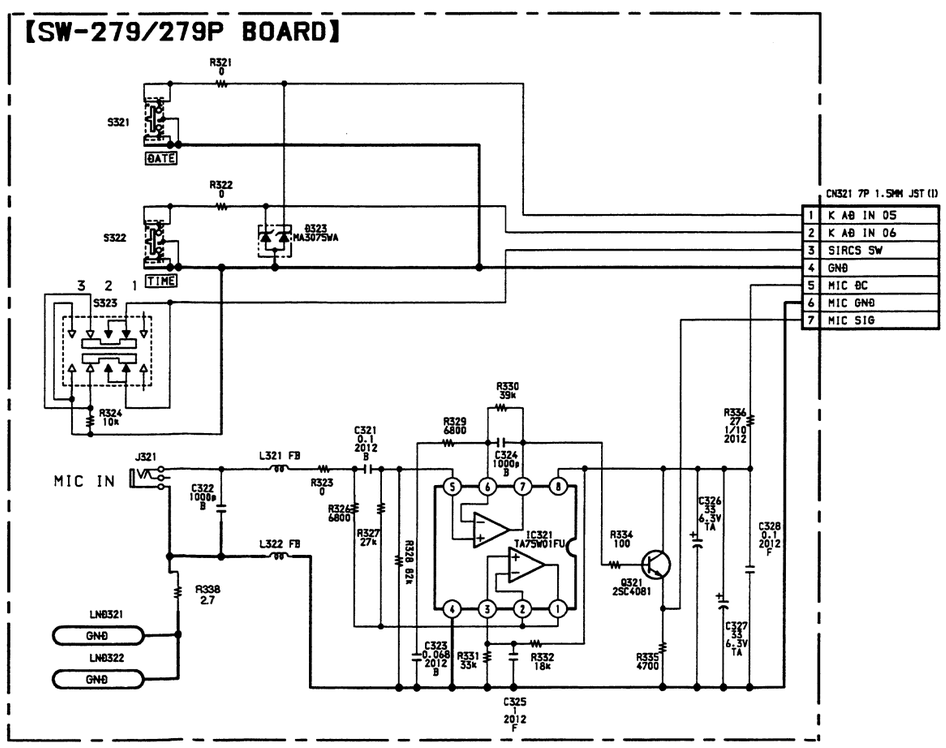






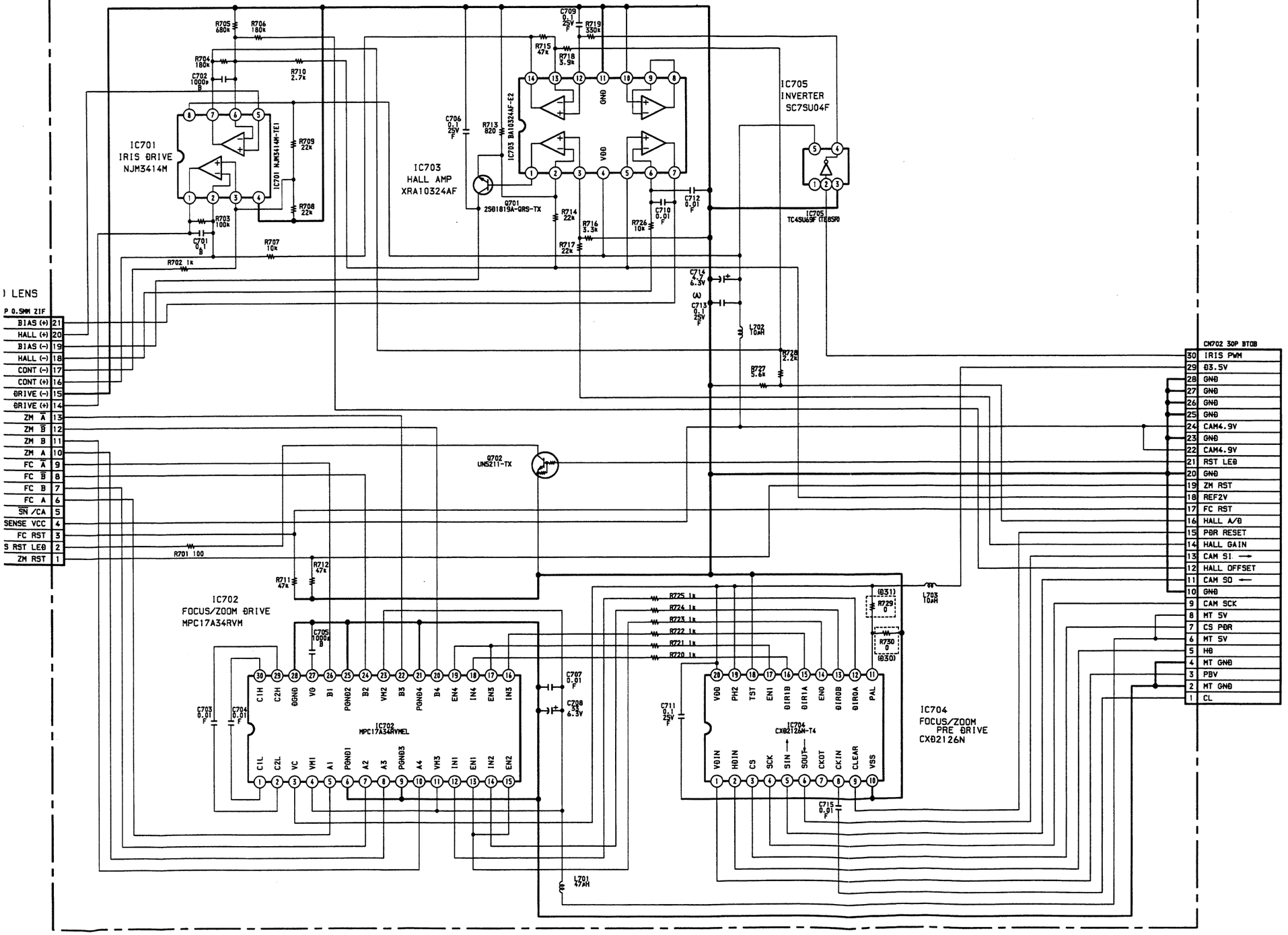






15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28

【LD-84/84P BOARD】

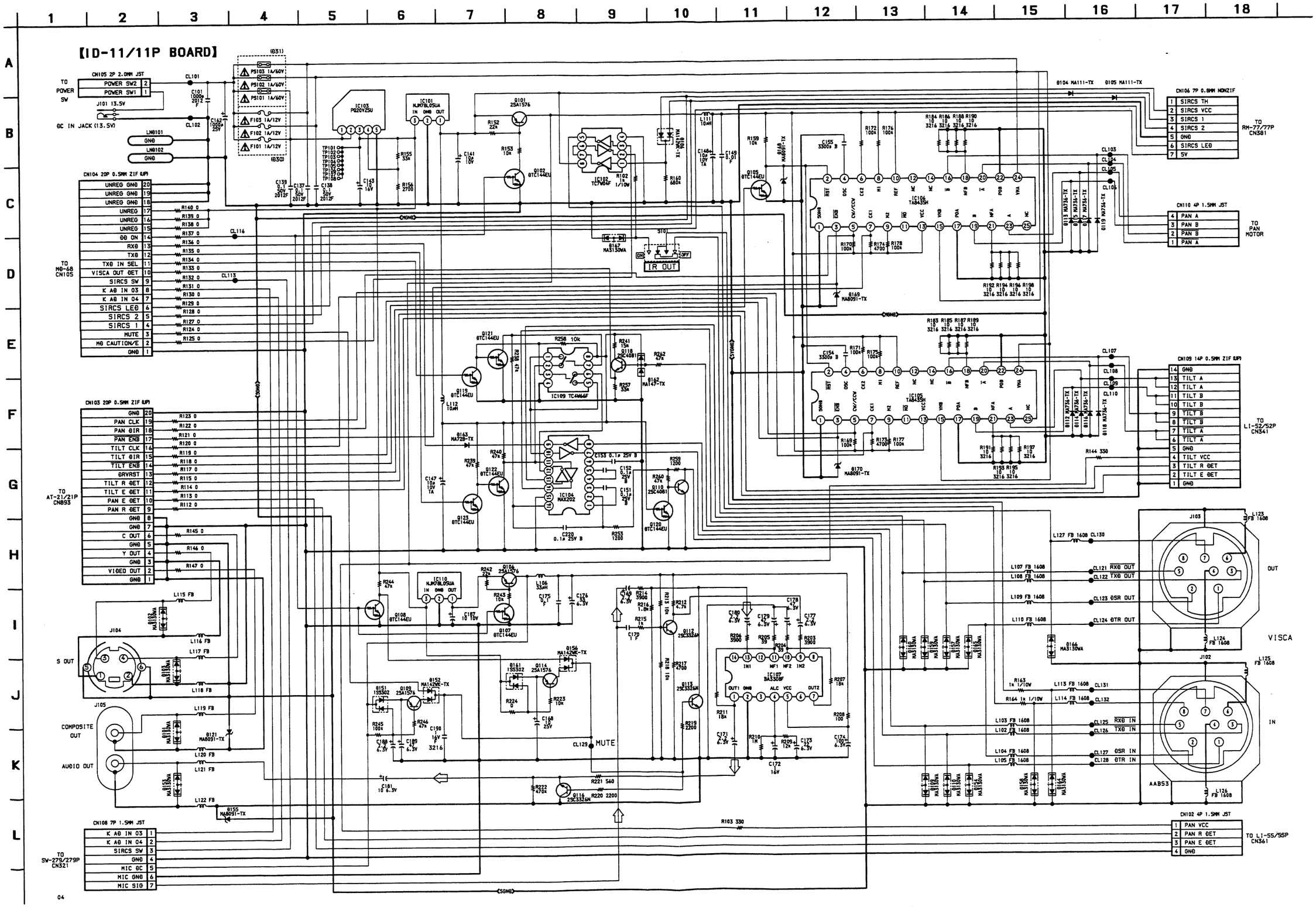


Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

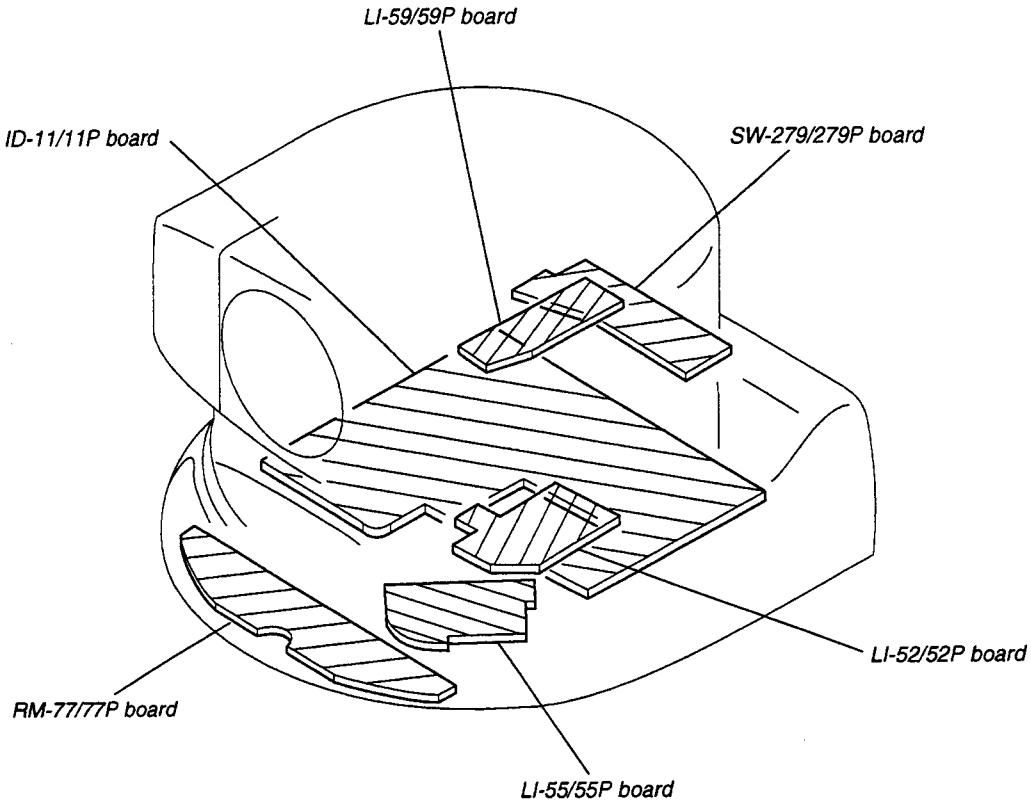
ID-11 (MOTOR DRIVE, INPUT/OUTPUT) SCHEMATIC DIAGRAM

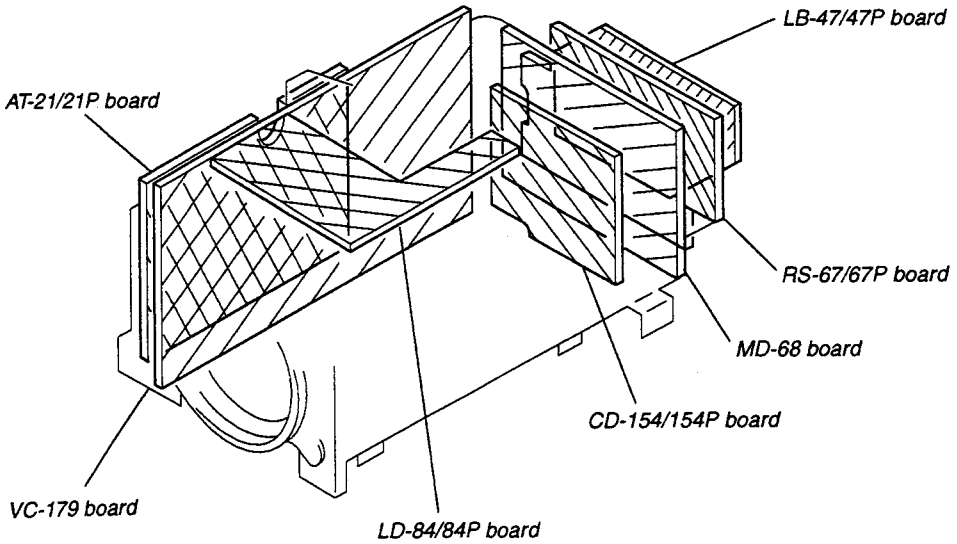
– Ref. No. ID-11/11P BOARD : 2,000 series –



SECTION 5
PRINTED WIRING BOARDS

5-1. CIRCUIT BOARDS LOCATION





5-2. PRINTED WIRING BOARDS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS.

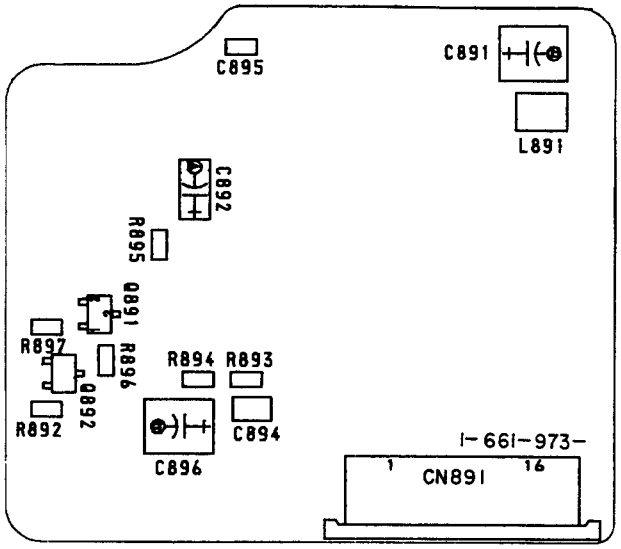
- **For printed wiring boards.**

- Through hole is omitted.
- Pattern is omitted.

CD-154/154P (CCD IMAGER) PRINTED WIRING BOARD

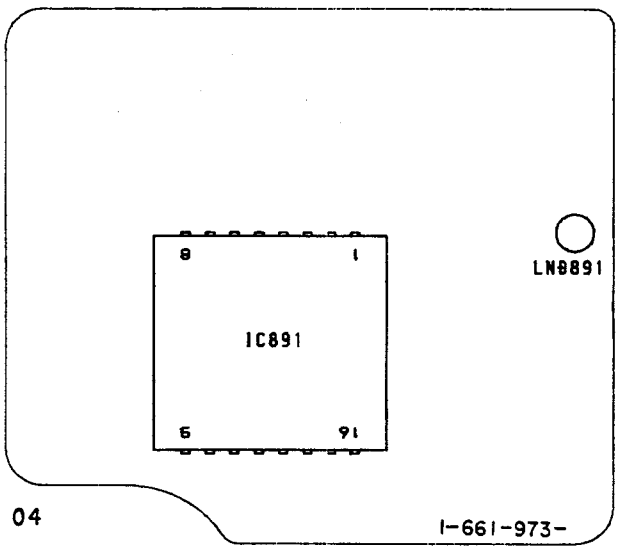
– Ref. No. CD-154/154P BOARD : 1,000 series –

【CD-154/154P BOARD】(SIDE A)



11 (D30)
21 (D31)

【CD-154/154P BOARD】(SIDE B)

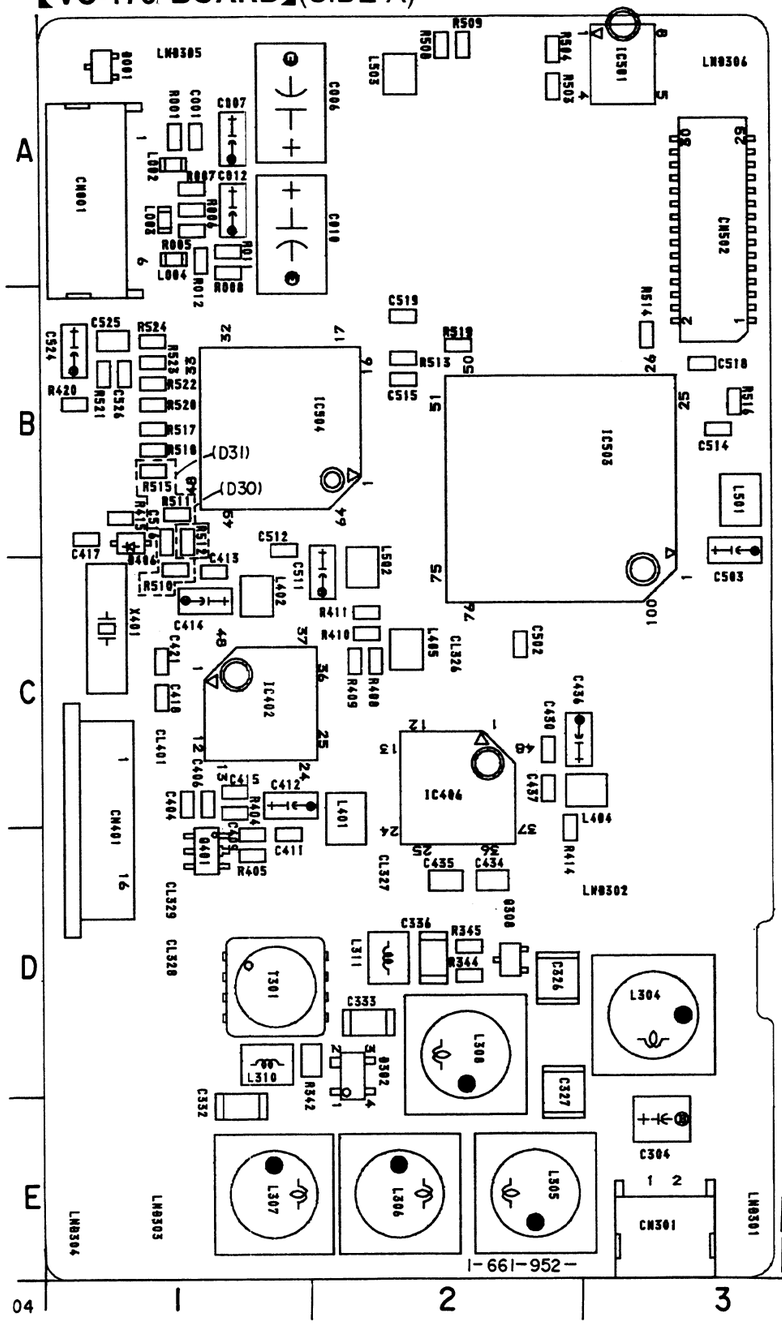


11 (D30)
21 (D31)

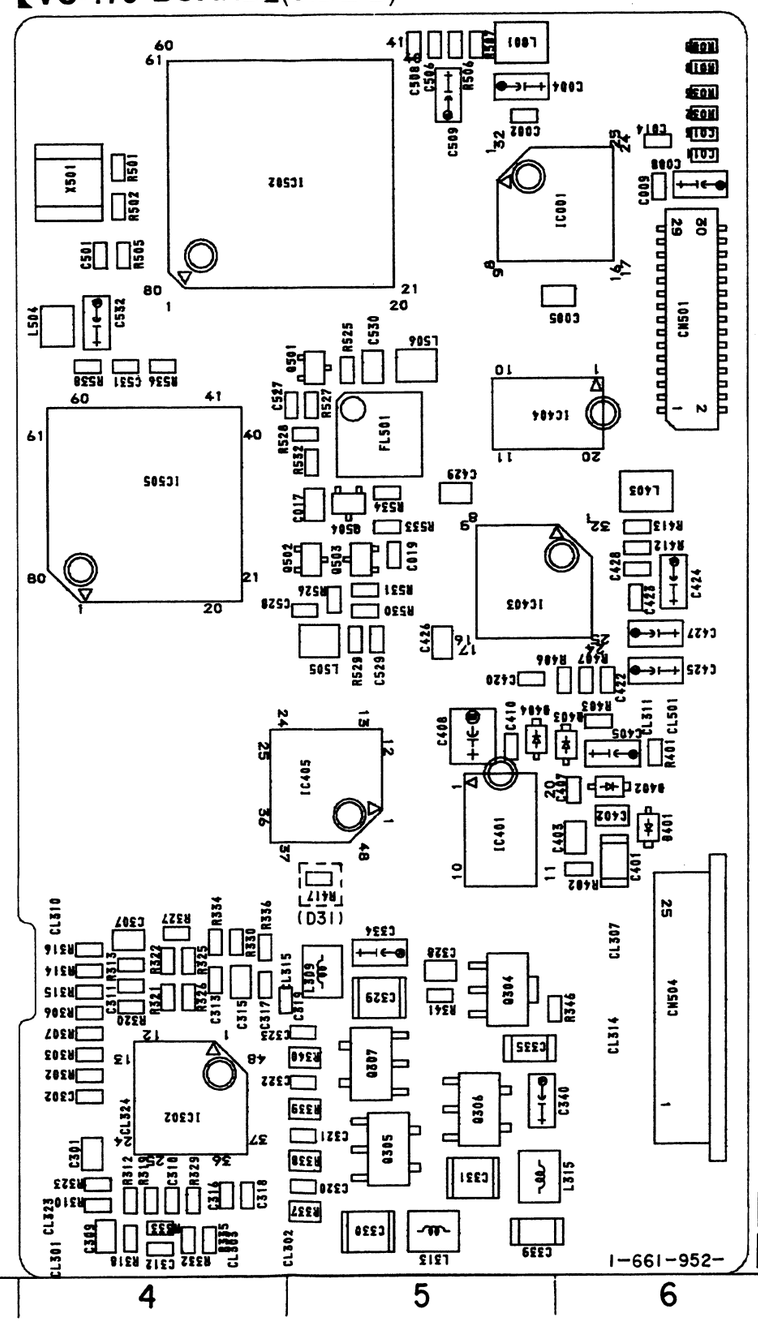
VC-179 (CAMERA) AT-21/21P (VIDEO PROCESS, MAIN CONTROL) PRINTED WIRING BOARDS

– Ref. No. VC-179 BOARD : 1,000 series, AT-21/21P BOARD : 1,000 series –

【VC-179 BOARD】(SIDE A)

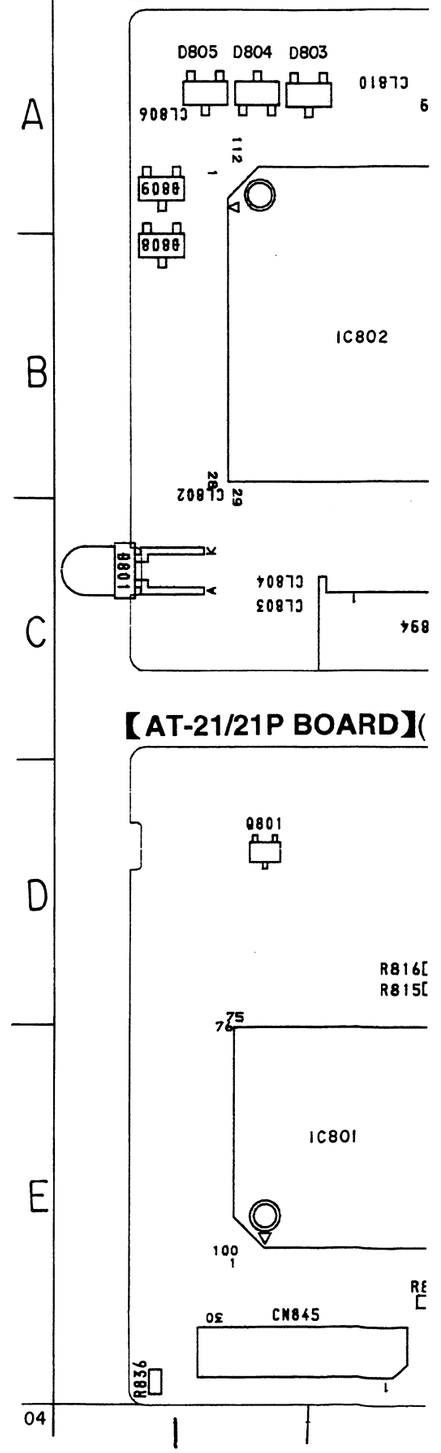


【VC-179 BOARD】(SIDE B)



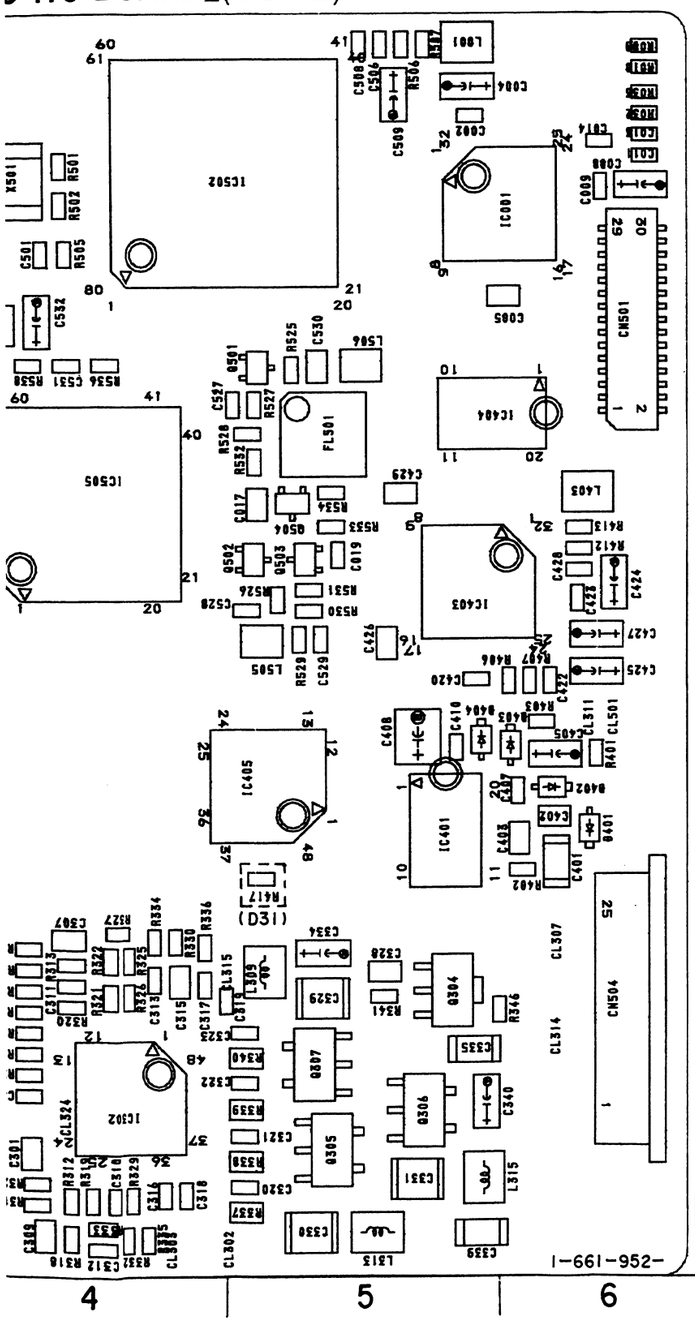
VC-179 BOARD	
D001	A-1
D302	D-2
D401	D-6
D402	C-6
D403	C-6
D404	C-5
D406	B-1
IC001	A-6
IC302	E-4
IC401	D-5
IC402	C-1
IC403	C-5
IC404	B-5
IC405	C-5
IC406	C-2
IC501	A-3
IC502	A-5
IC503	B-2
IC504	B-1
IC505	B-4
Q304	D-5
Q305	E-5
Q306	E-5
Q307	D-5
Q308	D-2
Q401	D-1
Q501	B-5
Q502	C-5
Q503	C-5
Q504	B-5

【AT-21/21P BOARD】(



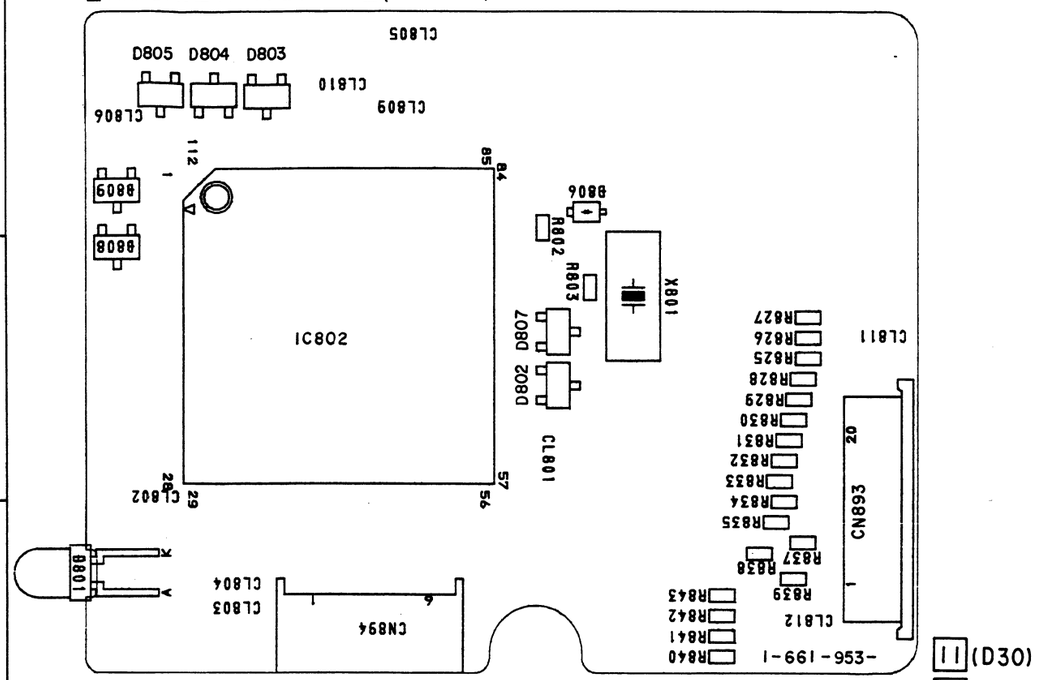
ARDS

C-179 BOARD】(SIDE B)



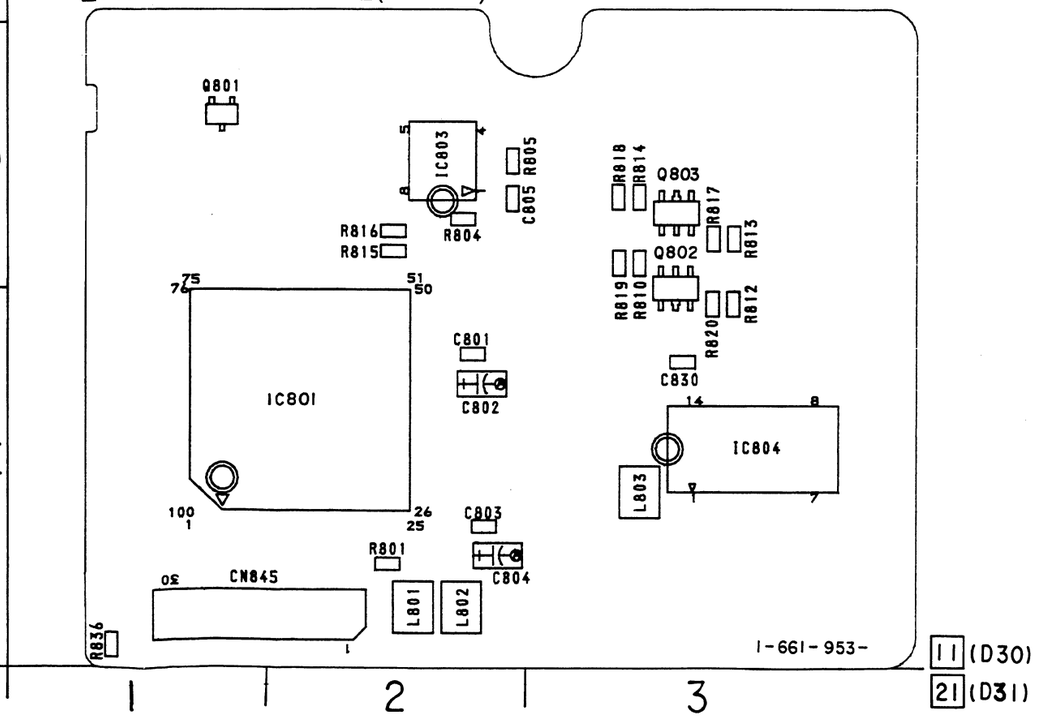
VC-179 BOARD	
D001	A-1
D302	D-2
D401	D-6
D402	C-6
D403	C-6
D404	C-5
D406	B-1
IC001	A-6
IC302	E-4
IC401	D-5
IC402	C-1
IC403	C-5
IC404	B-5
IC405	C-5
IC406	C-2
IC501	A-3
IC502	A-5
IC503	B-2
IC504	B-1
IC505	B-4
Q304	D-5
Q305	E-5
Q306	E-5
Q307	D-5
Q308	D-2
Q401	D-1
Q501	B-5
Q502	C-5
Q503	C-5
Q504	B-5

【AT-21/21P BOARD】(SIDE A)



AT-21/21P BOARD	
D801	C-1
D802	B-3
D803	A-1
D804	A-1
D805	A-1
D806	A-3
D807	B-3
D808	B-1
D809	A-1
IC801	E-2
IC802	B-2
IC803	D-2
IC804	E-3
Q801	D-1
Q802	E-3
Q803	D-3

【AT-21/21P BOARD】(SIDE B)



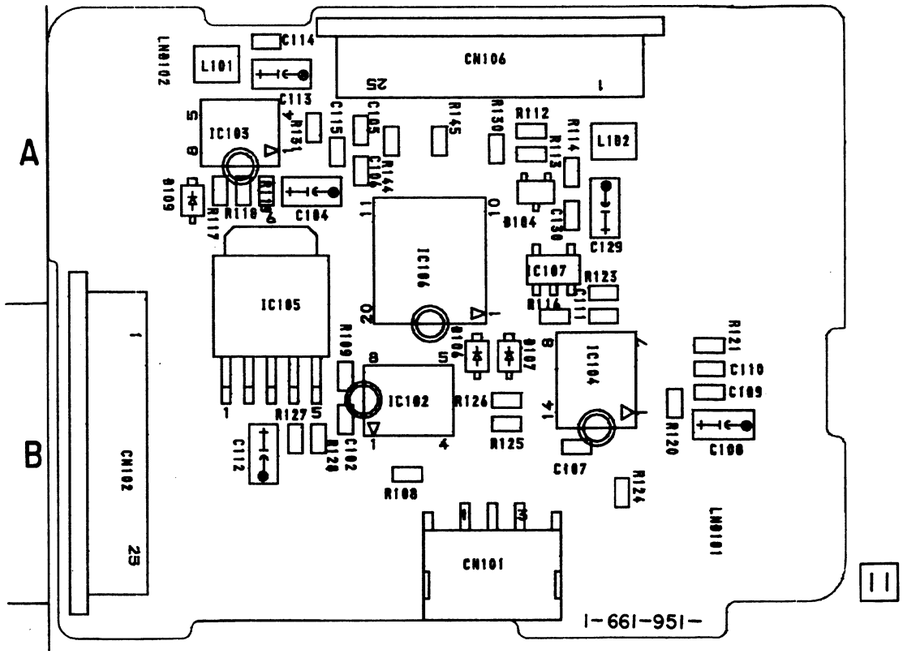
RS-67/67P (BACK UP) LB-47/47P (BATTERY) MD-68 (MODE CONTROL) PRINTED WIRING BOARDS

– Ref. No. RS-67/67P BOARD : 2,000 series, LB-47/47P BOARD : 2,000 series, MD-68 BOARD : 1,000 series –

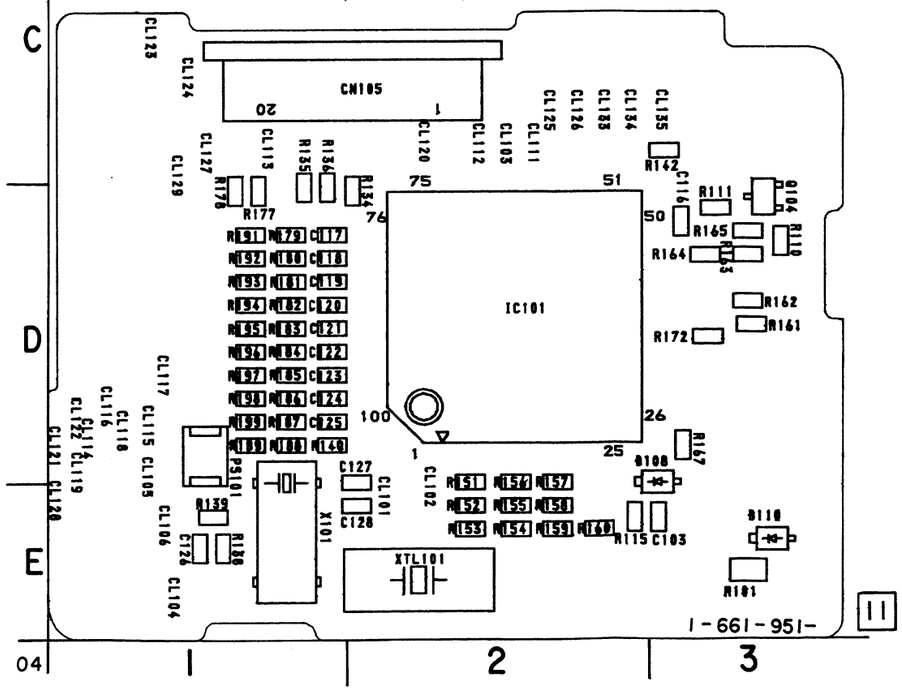
MD-68 BOARD

D104	A-2
D106	B-2
D107	B-2
D108	D-3
D109	A-1
D110	E-3
IC101	D-2
IC102	B-2
IC103	A-1
IC104	B-2
IC105	B-1
IC106	A-2
IC107	A-2
Q104	D-3

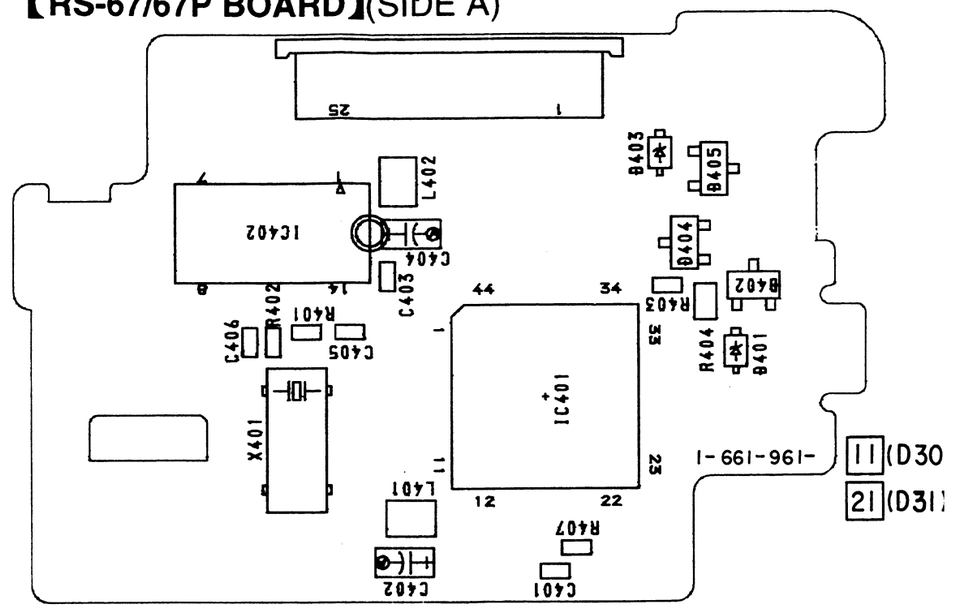
【MD-68 BOARD】(SIDE A)



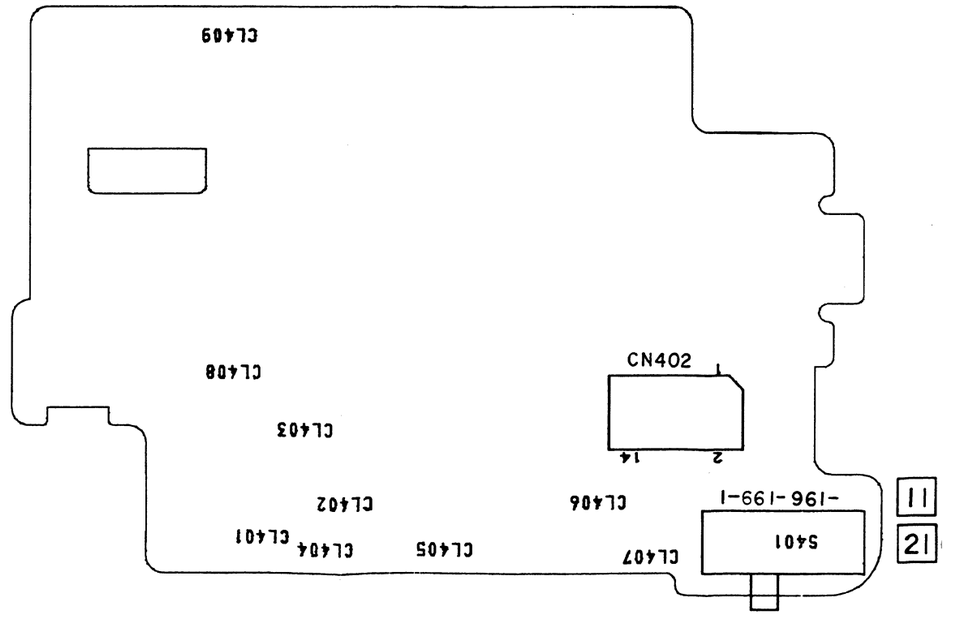
【MD-68 BOARD】(SIDE B)



【RS-67/67P BOARD】(SIDE A)

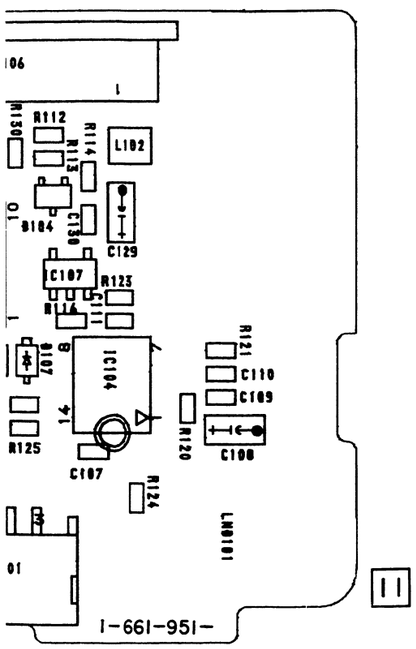


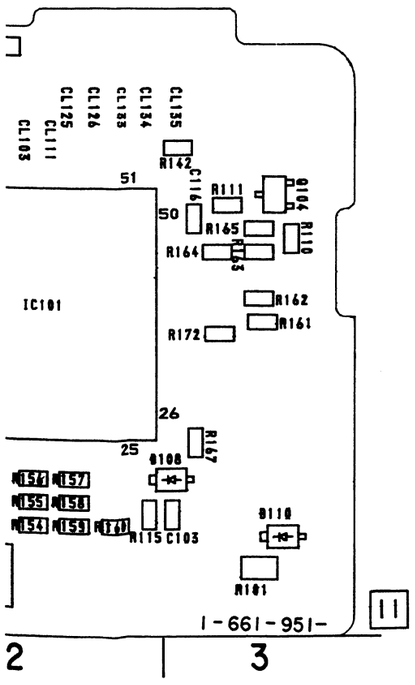
【RS-67/67P BOARD】(SIDE B)



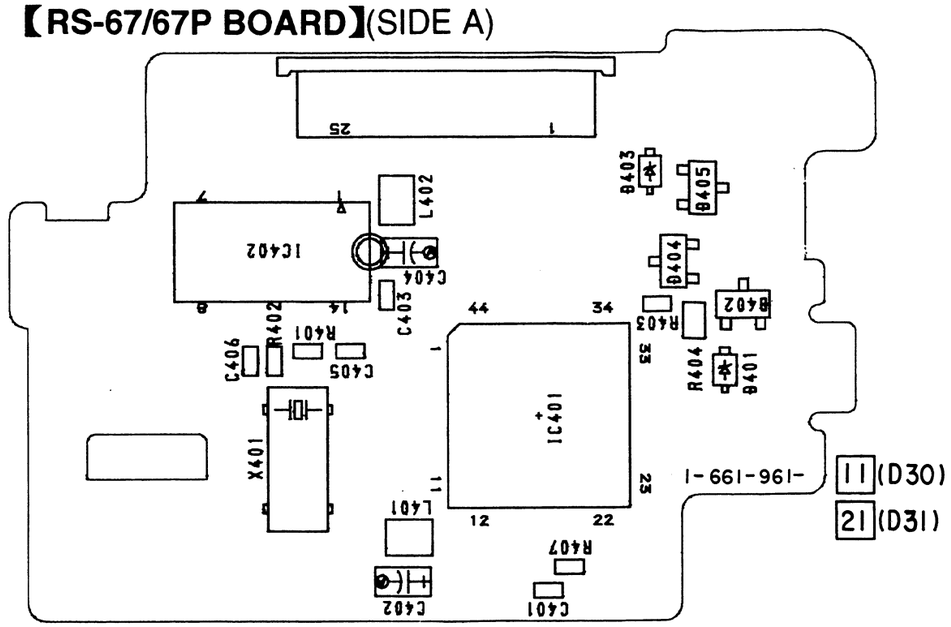
MD-68 (MODE CONTROL) PRINTED WIRING BOARDS

BOARD : 2,000 series, MD-68 BOARD : 1,000 series –

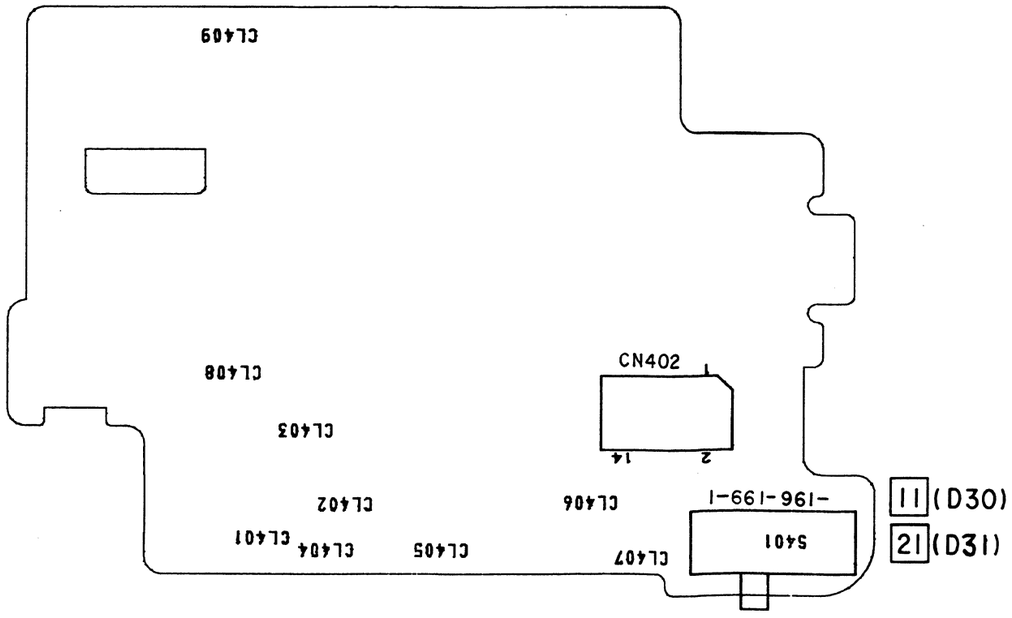




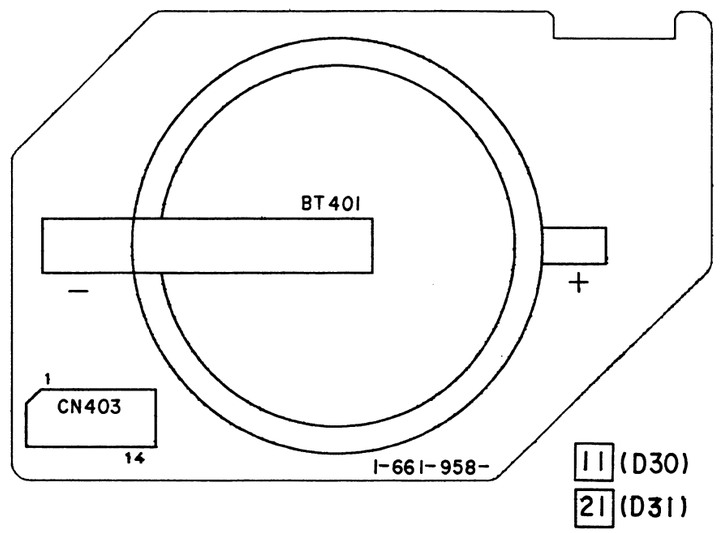
【RS-67/67P BOARD】(SIDE A)



【RS-67/67P BOARD】(SIDE B)



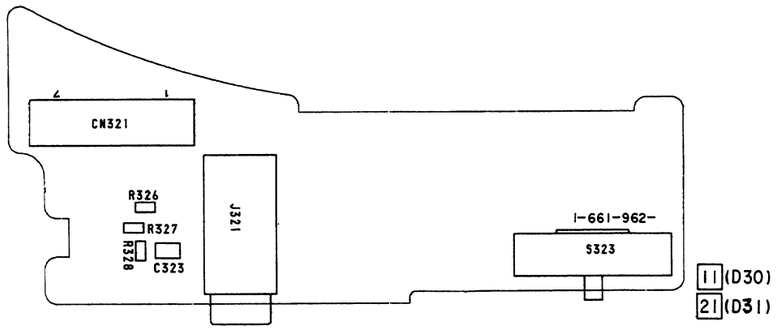
【LB-47/47P BOARD】



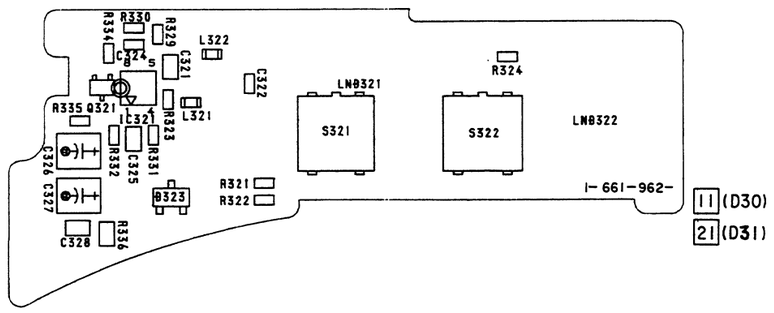
LI-52/52P (TILT END SENSOR) LI-55/55P (PAN R SENSOR) LI-59/59P (TILT R SENSOR) LD-84/84P (LENS DRIVE) RM-77/77P (SIRCS RECEIVE) SW-279/279P (MIC AMP) PRINTED WIRING BOARDS

– Ref. No. LI-52/52P BOARD : 2,000 series, LI-55/55P BOARD : 2,000 series, LI-59/59P BOARD : 2,000 series, LD-84/84P BOARD : 2,000 series, RM-77/77P BOARD : 2,000 series, SW-279/279P BOARD : 2,000 series –

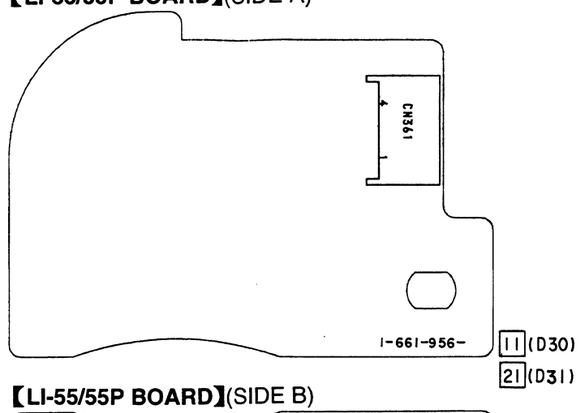
【SW-279/279P BOARD】(SIDE A)



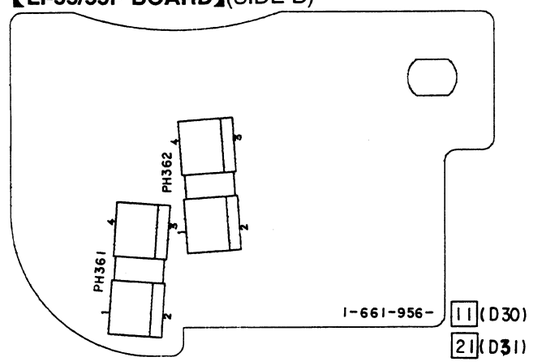
【SW-279/279P BOARD】(SIDE B)



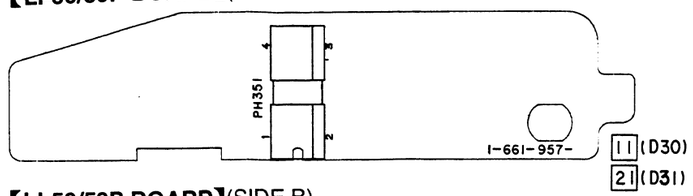
【LI-55/55P BOARD】(SIDE A)



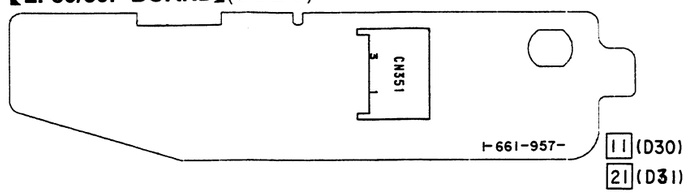
【LI-55/55P BOARD】(SIDE B)



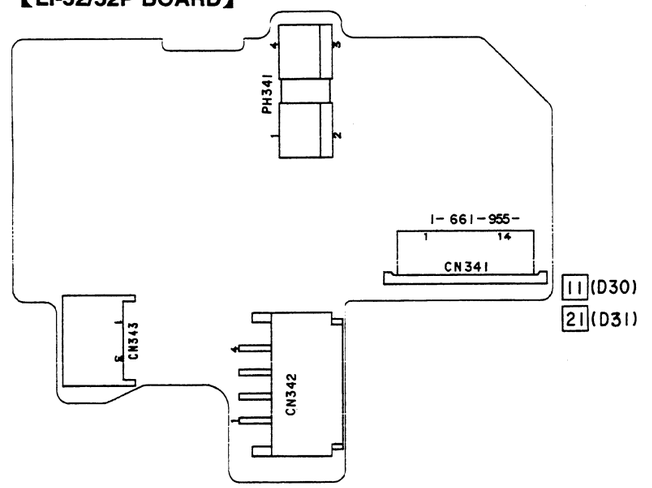
【LI-59/59P BOARD】(SIDE A)



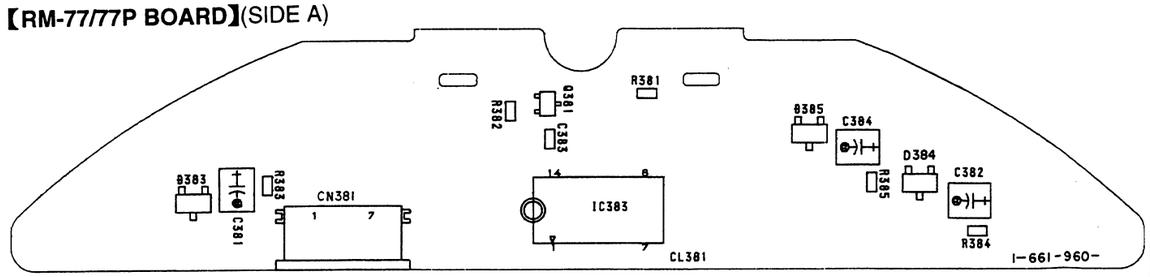
【LI-59/59P BOARD】(SIDE B)



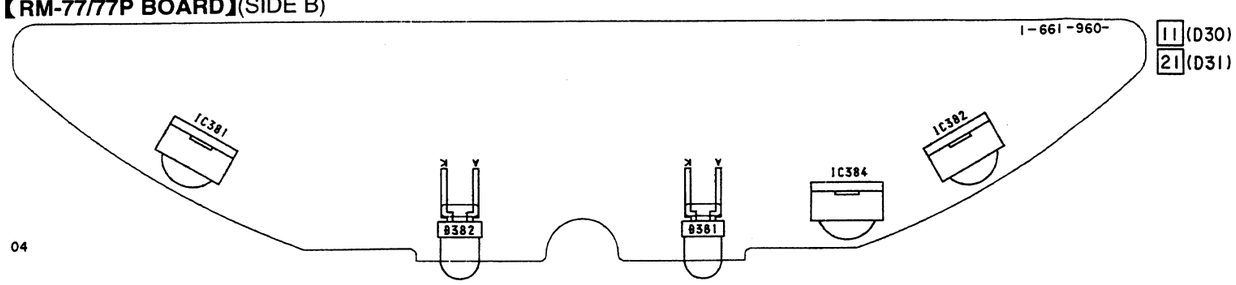
【LI-52/52P BOARD】



【RM-77/77P BOARD】(SIDE A)

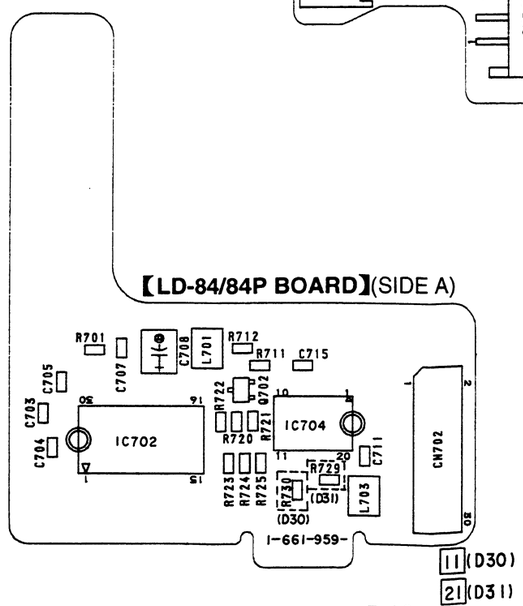


【RM-77/77P BOARD】(SIDE B)

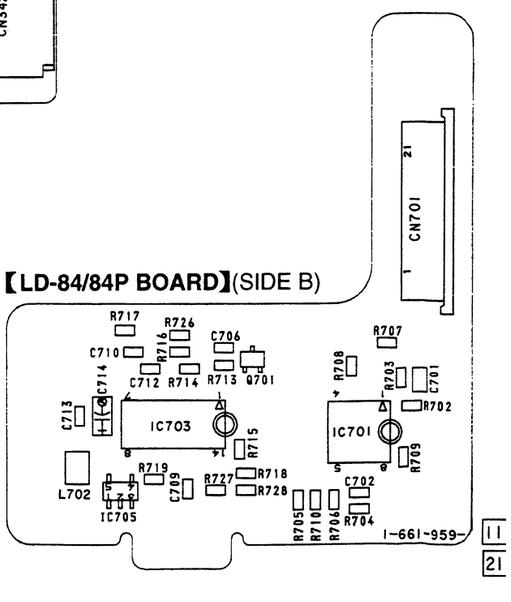


04

【LD-84/84P BOARD】(SIDE A)



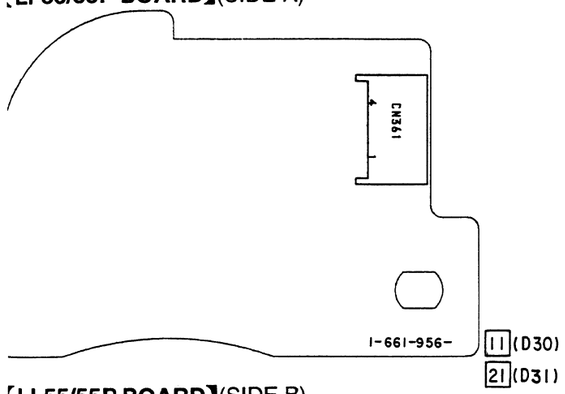
【LD-84/84P BOARD】(SIDE B)



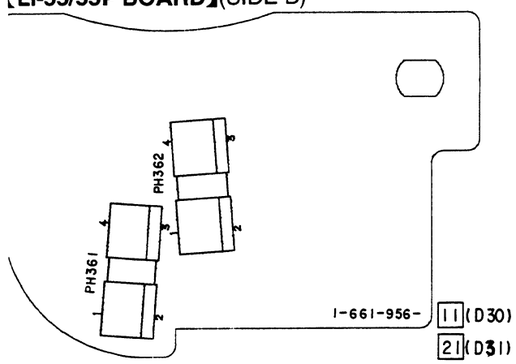
LD-84/84P (LENS DRIVE) RM-77/77P (SIRCS RECEIVE) SW-279/279P (MIC AMP) PRINTED WIRING BOARDS

s, LD-84/84P BOARD : 2,000 series, RM-77/77P BOARD : 2,000 series, SW-279/279P BOARD : 2,000 series –

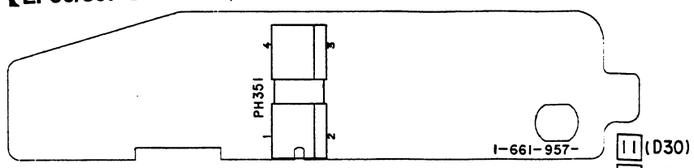
【LI-55/55P BOARD】(SIDE A)



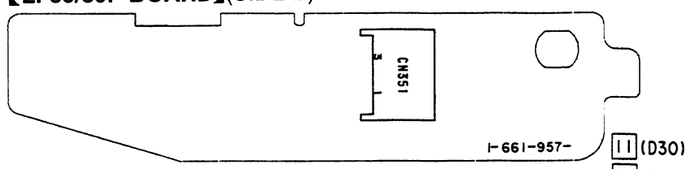
【LI-55/55P BOARD】(SIDE B)



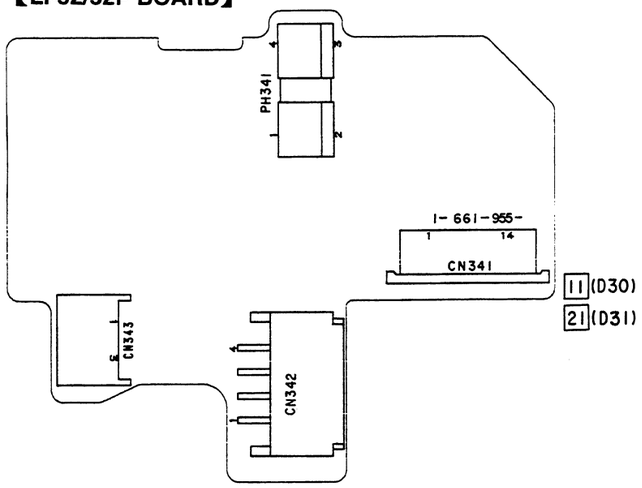
【LI-59/59P BOARD】(SIDE A)

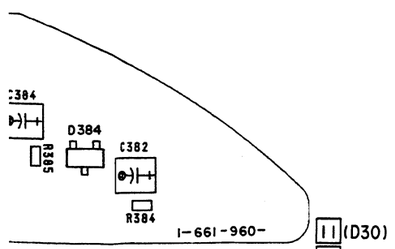


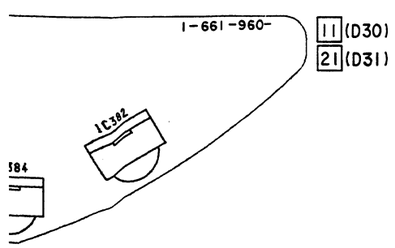
【LI-59/59P BOARD】(SIDE B)



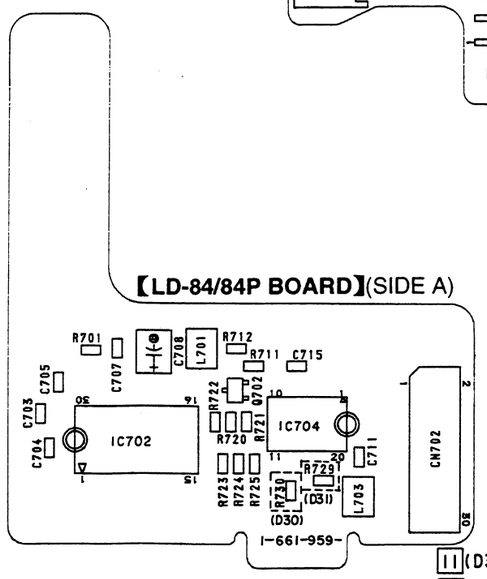
【LI-52/52P BOARD】



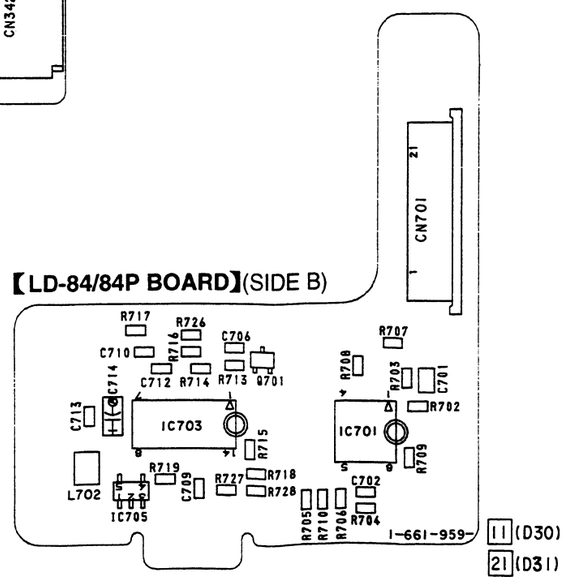




【LD-84/84P BOARD】(SIDE A)



【LD-84/84P BOARD】(SIDE B)



ID-11 (MOTOR DRIVE, INPUT/OUTPUT) PRINTED WIRING BOARD

– Ref. No. ID-11/11P BOARD : 2,000 series –

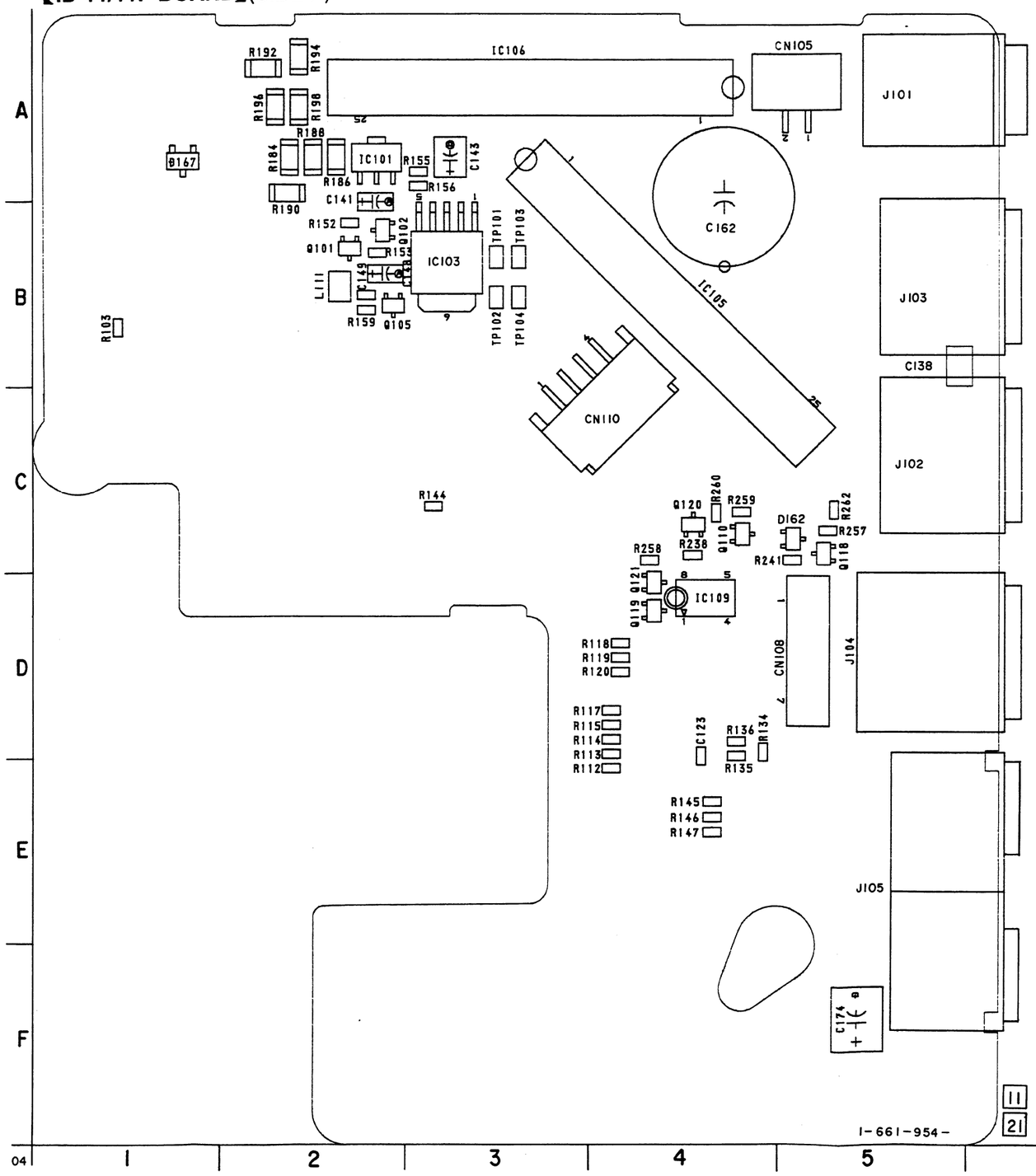
ID-11/11P BOARD

D101	D-6
D102	D-7
D103	D-7
D104	C-10
D105	C-10
D106	C-10
D109	C-7
D110	C-7
D112	B-9
D113	A-10
D114	B-9
D115	A-10
D116	C-9
D117	A-10
D118	C-9
D119	A-10
D121	E-7
D151	F-9
D152	F-9
D153	D-6
D154	C-7
D155	F-6
D156	F-9
D157	B-7
D158	C-8
D159	B-7
D160	B-7
D161	E-9
D162	C-5
D163	D-7
D164	C-7
D165	B-7
D166	B-7
D167	A-1
D168	A-7
D169	A-8
D170	B-9

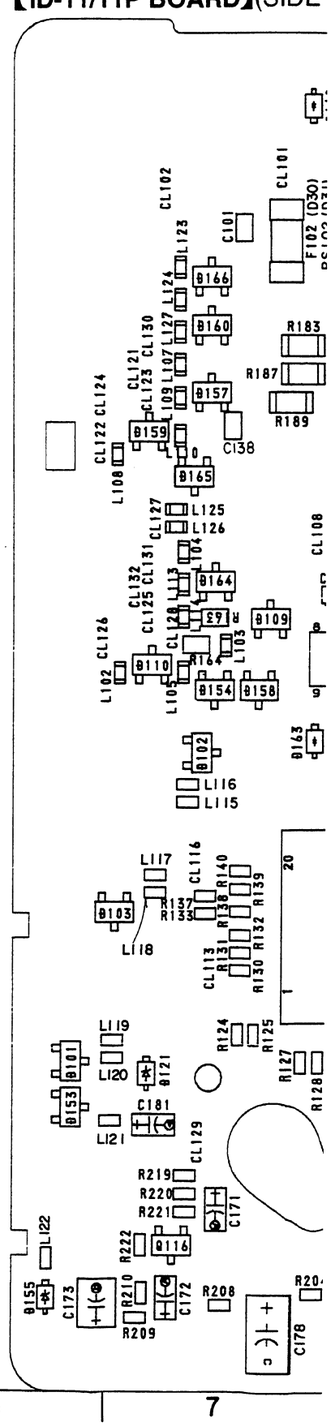
IC101	A-2
IC102	C-10
IC103	B-3
IC104	C-8
IC105	B-4
IC106	A-3
IC107	F-8
IC109	D-4
IC110	F-10

Q101	B-2
Q102	B-2
Q105	B-2
Q106	F-9
Q107	F-9
Q108	F-9
Q109	F-9
Q110	C-4
Q112	F-8
Q113	F-8
Q114	F-9
Q116	F-7
Q118	C-5
Q119	D-4
Q120	C-4
Q121	D-4
Q122	D-8
Q123	D-8

【ID-11/11P BOARD】(SIDE A)



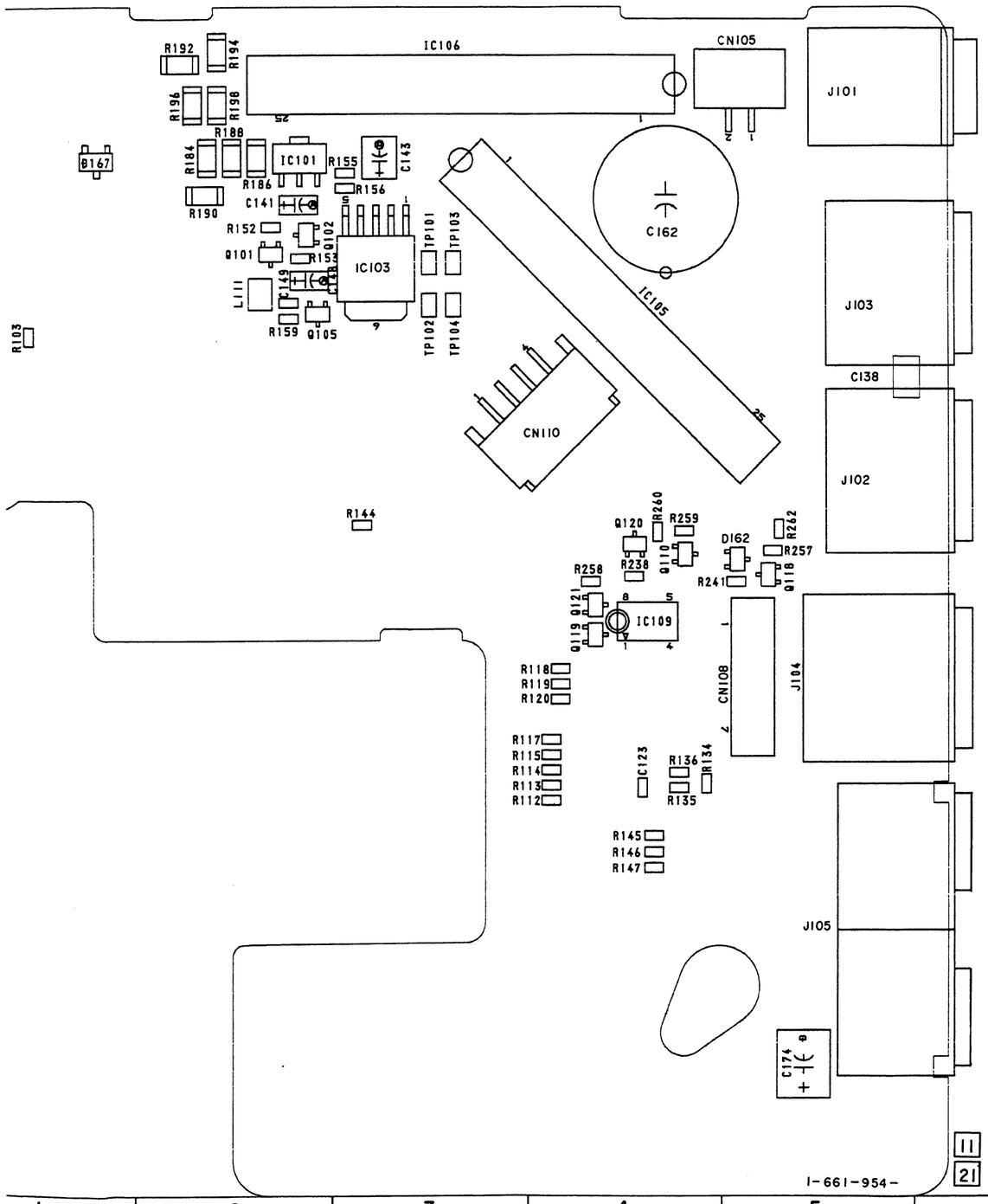
【ID-11/11P BOARD】(SIDE



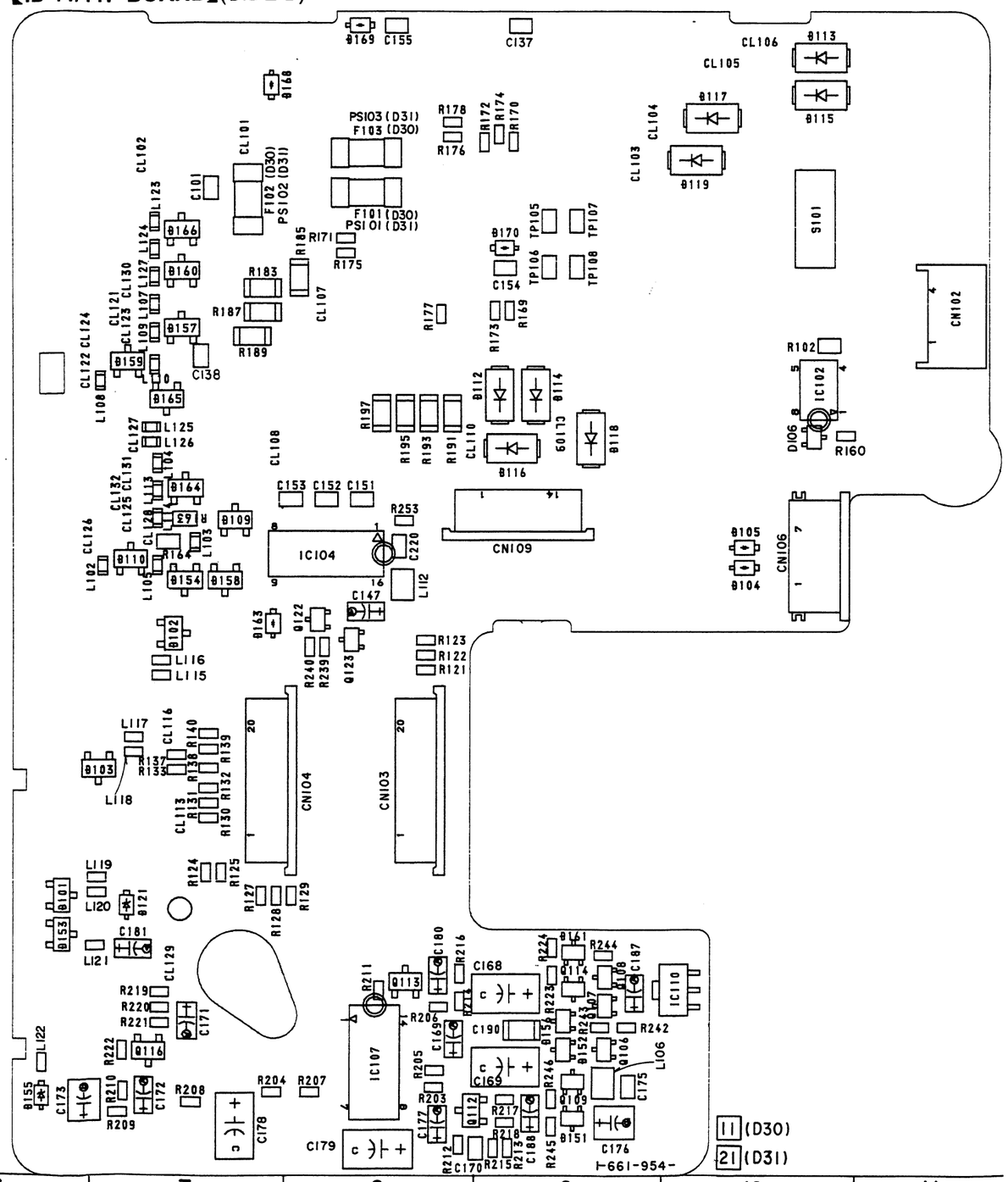
IOTOR DRIVE, INPUT/OUTPUT) PRINTED WIRING BOARD

ID-11/11P BOARD : 2,000 series –

1/11P BOARD】(SIDE A)



【ID-11/11P BOARD】(SIDE B)



5-13

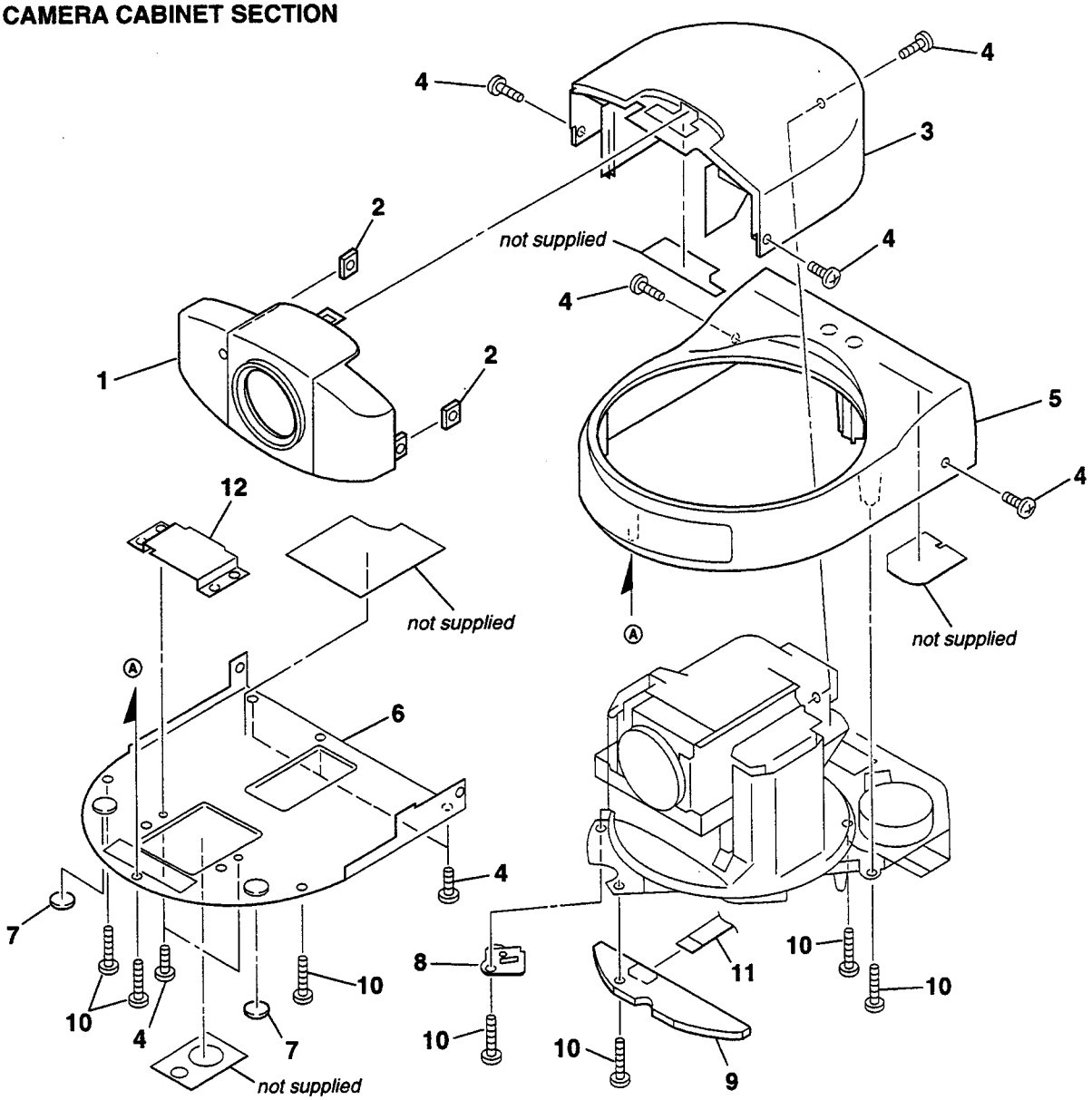
5-14 E

SECTION 6
REPAIR PARTS LIST

6-1. EXPLODED VIEWS

NOTE:
- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.

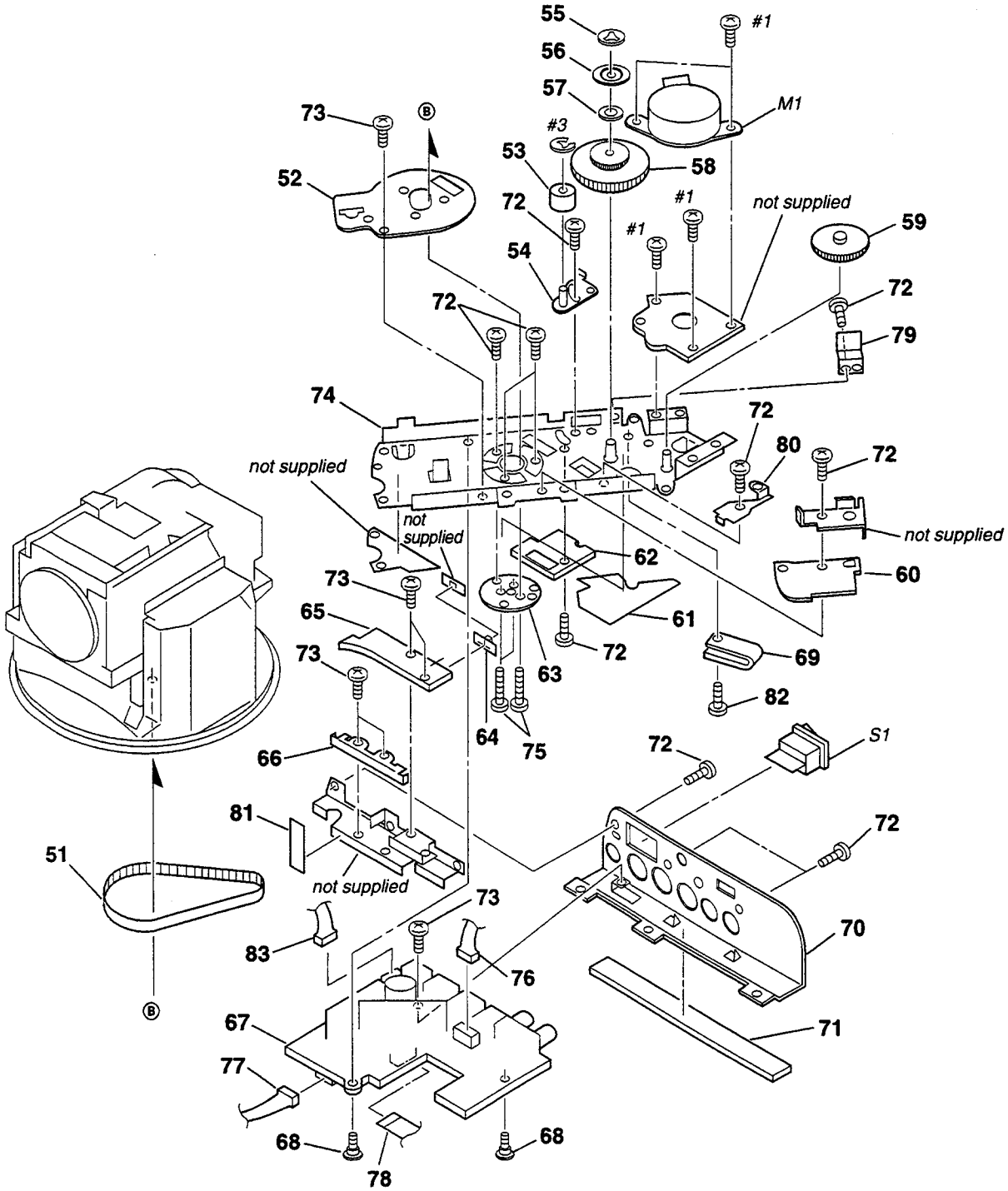
6-1-1. CAMERA CABINET SECTION



Ref. No.	Part No.	Description	Remark
1	X-3946-600-1	CABINET (FRONT) ASSY, CAMERA	
2	3-718-233-01	NUT, PLATE	
3	3-971-324-01	CABINET (UPPER), CAMERA	
4	3-719-381-01	SCREW (M2X4)	
5	X-3946-599-1	CABINET ASSY, MAIN	
* 6	X-3946-422-1	PLATE ASSY, BOTTOM	
7	3-740-607-01	CUSHION	

Ref. No.	Part No.	Description	Remark
* 8	3-971-400-01	PLATE (P), GROUND	
* 9	A-7072-768-A	RM-77 BOARD, COMPLETE (D30)	
* 9	A-7072-798-A	RM-77P BOARD, COMPLETE (D31)	
10	3-971-322-01	SCREW (2.6X8)	
11	1-777-304-11	CABLE, FLEXIBLE FLAT (FFC-188)	
* 12	3-971-383-01	LID, TRIPOD	

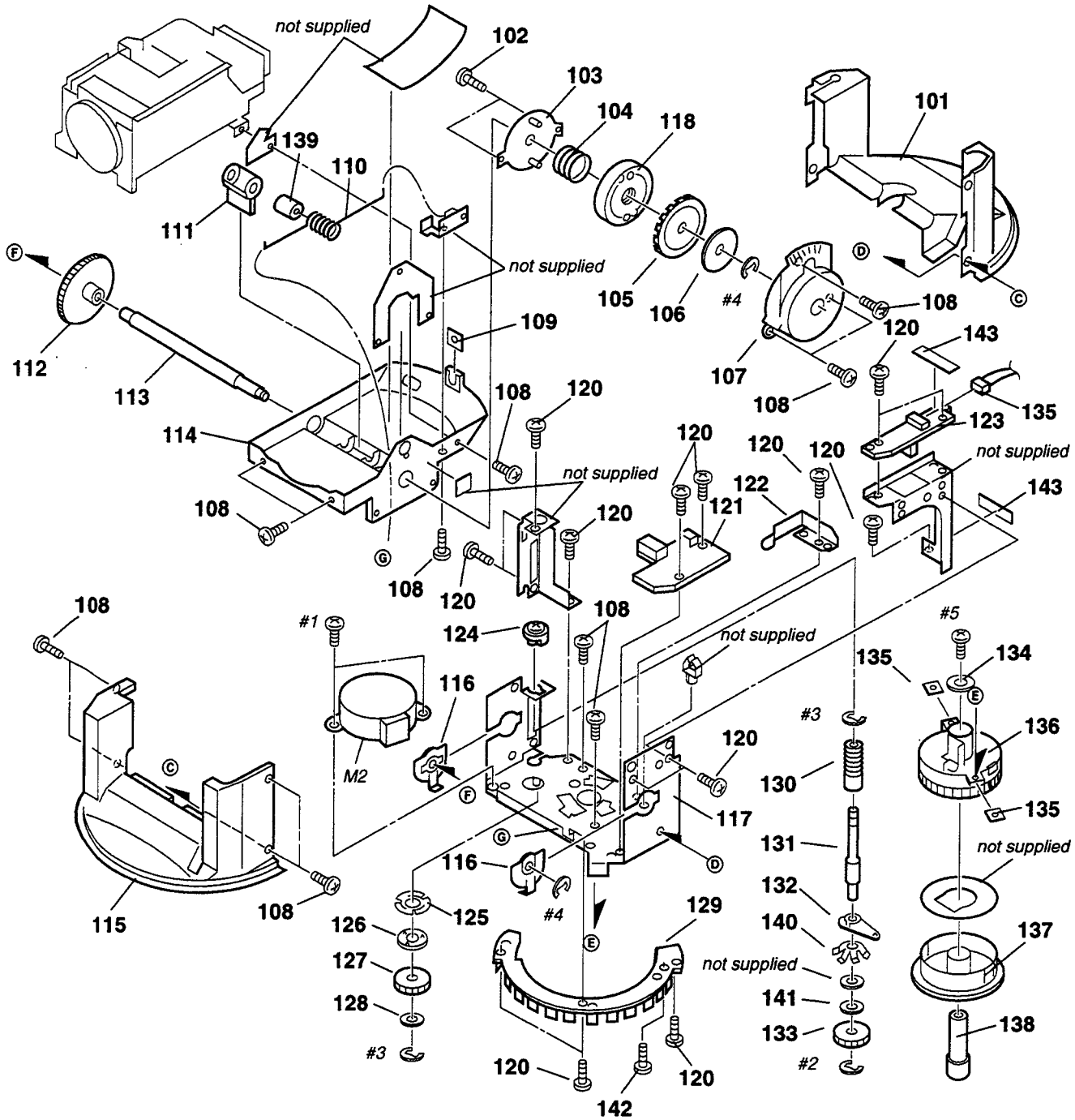
6-1-2. PAN BASE SECTION



Ref. No.	Part No.	Description	Remark
51	3-971-346-01	BELT, TIMING	
52	3-972-548-01	PLATE, PAN MANUAL	
53	3-971-354-01	PULLEY, TENSION	
* 54	X-3946-396-1	ARM ASSY, PULLEY	
* 55	3-650-537-00	WASHER	
56	3-971-398-01	STOPPER, BELT EXTRACT	
57	3-972-547-01	WASHER, PULLEY	
58	3-971-343-01	PULLEY	
59	3-971-342-01	GEAR, PAN DECELERATION	
* 60	1-661-956-11	LI-55 BOARD (D30)	
* 60	1-661-956-21	LI-55P BOARD (D31)	
* 61	3-971-381-01	INSULATOR, PAN BASE	
* 62	3-971-640-01	HOLDER (UPPER), PAN	
* 63	3-971-399-01	BRACKET, MAIN SHAFT	
64	3-952-317-01	BUTTON, DBB	
* 65	A-7072-770-A	SW-279 BOARD, COMPLETE (D30)	
* 65	A-7072-800-A	SW-279P BOARD, COMPLETE (D31)	
* 66	3-972-542-01	PLATE, ID GROUND	
* 67	A-7072-762-A	ID-11 BOARD, COMPLETE (D30)	
* 67	A-7072-792-A	ID-11P BOARD, COMPLETE (D31)	

Ref. No.	Part No.	Description	Remark
68	3-730-107-01	SCREW (M2X2.2)	
* 69	3-971-641-01	HOLDER (LOWER), PAN	
* 70	3-971-393-01	PANEL, REAR	
71	3-971-634-01	FOOT (REAR)	
72	3-719-381-01	SCREW (M2X4)	
73	3-713-786-21	SCREW (M2X3)	
* 74	X-3946-394-1	BASE ASSY, PAN	
75	3-719-381-21	SCREW (M2X6)	
76	1-956-268-11	HARNESS, IS-55	
77	1-956-267-11	HARNESS, IL-52	
78	1-777-302-11	CABLE, FLEXIBLE FLAT (FFC-186)	
79	3-973-626-01	STOPPER, P	
80	3-973-625-01	SPRING, PULLEY	
81	3-849-226-01	CLOTH, UNWEAVED (25X6X0.5)	
82	3-719-381-71	SCREW (M2X8)	
83	1-956-271-11	HARNESS, PW-58	
M1	1-698-797-11	MOTOR, STEPPING (PAN)	
S1	1-762-025-11	SWITCH, POWER (POWER)	

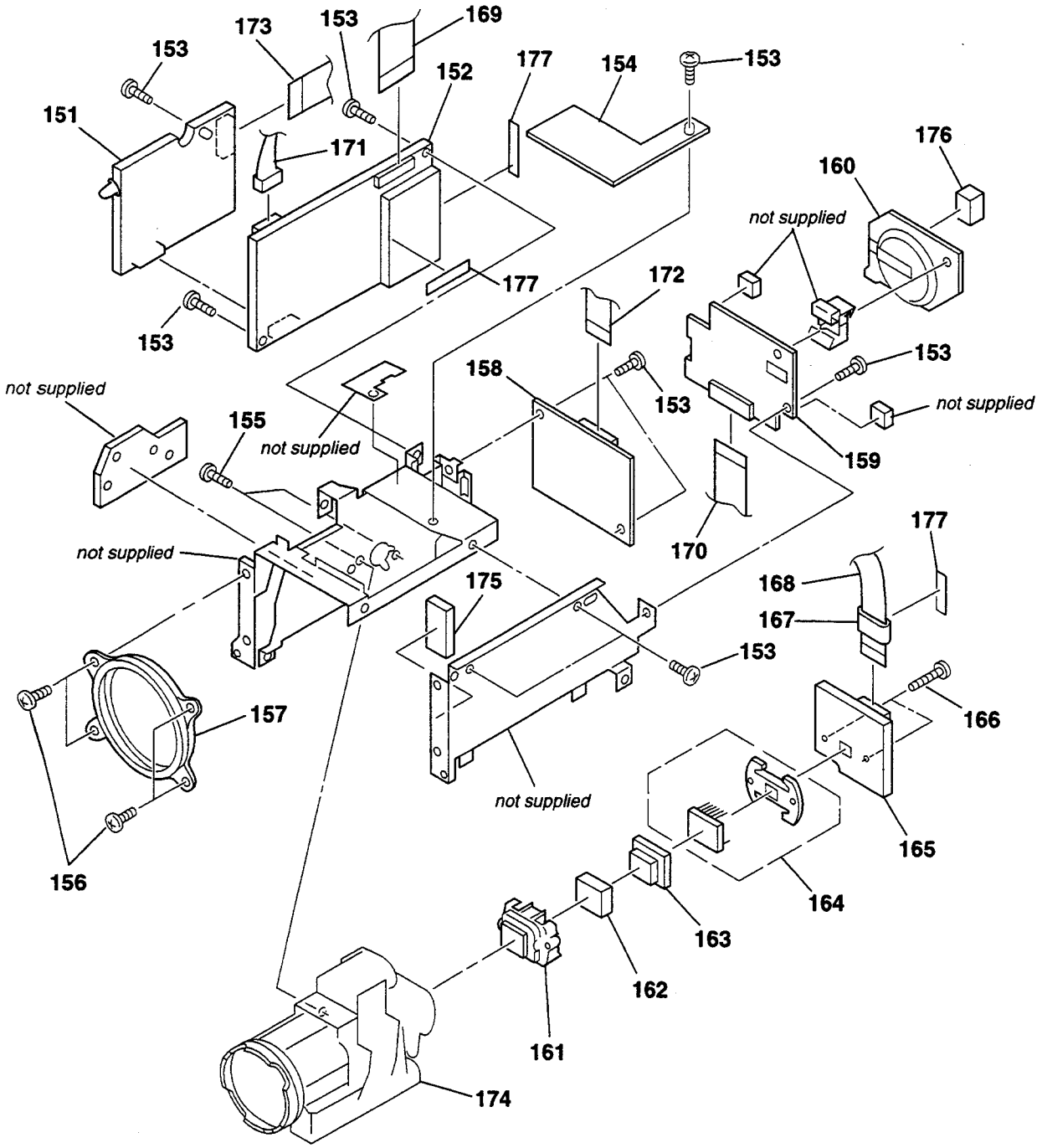
6-1-3. TILT BASE SECTION



Ref. No.	Part No.	Description	Remark
101	3-971-362-01	CABINET (REAR), PAN	
102	3-945-884-31	SCREW	
* 103	X-3946-397-1	RETAINER ASSY	
104	3-971-368-01	SPRING, COMPRESSION	
105	3-971-372-01	DISK	
106	3-971-374-01	REINFORCEMENT, ROTARY	
107	3-971-328-01	CASE, CLUTCH	
108	3-719-381-01	SCREW (M2X4)	
109	3-718-233-01	NUT, PLATE	
110	3-971-360-01	SPRING, TORSION	
111	3-971-327-01	JOINT, FLEXIBLE	
112	3-971-357-01	GEAR, TILT	
* 113	3-971-329-01	SHAFT, TILT	
114	3-971-326-01	CABINET (LOWER), CAMERA	
115	3-971-361-01	CABINET (FRONT), PAN	
116	3-971-330-01	BEARING, TILT	
* 117	X-3946-395-1	BASE ASSY, TILT	
118	3-971-367-01	PLATE, CLICK	
120	3-713-786-21	SCREW (M2X3)	
* 121	1-661-955-11	LI-52 BOARD (D30)	
* 121	1-661-955-21	LI-52P BOARD (D31)	
* 122	3-971-349-01	PLATE, MAIN SHAFT GROUND	
* 123	1-661-957-11	LI-59 BOARD (D30)	

Ref. No.	Part No.	Description	Remark
* 123	1-661-957-21	LI-59P BOARD (D31)	
124	3-971-341-01	BEARING (B), WORM	
125	3-971-636-01	SPRING, FRICTION	
* 126	3-971-639-01	PLATE, GEAR	
127	3-971-334-01	GEAR, TILT DECELERATION	
128	3-701-439-11	WASHER	
* 129	3-971-377-01	WING, PAN SENSOR	
130	3-971-356-01	GEAR, WORM	
131	3-971-335-01	SHAFT, TILT WORM	
132	3-971-340-01	BEARING (A), WORM	
133	3-971-333-01	GEAR, TILT (MIDWAY)	
134	3-971-323-01	WASHER	
135	1-956-270-11	HARNESS, LL-51	
136	3-971-364-01	BEARING, MAIN SHAFT	
137	3-971-344-01	PULLEY, PAN	
138	3-971-348-01	SHAFT, MAIN	
139	3-973-487-01	SLEEVE, TILT	
140	3-973-488-01	SPRING, T FRICTION	
141	3-973-489-01	WASHER, T	
142	3-948-339-41	SCREW, TAPPING	
143	3-849-226-01	CLOTH, UNWEAVED (25X6X0.5)	
M2	1-698-797-21	MOTOR, STEPPING (TILT)	

6-1-4. LENS SECTION



Ref. No.	Part No.	Description	Remark
* 151	A-7072-761-A	AT-21 BOARD, COMPLETE (D30)	
* 151	A-7072-791-A	AT-21P BOARD, COMPLETE (D31)	
* 152	A-7072-759-A	VC-179 BOARD, COMPLETE (D30)	
* 152	A-7072-790-A	VC-179 BOARD, COMPLETE (D31)	
153	3-713-786-21	SCREW (M2X3)	
* 154	A-7072-764-A	LD-84 BOARD, COMPLETE (D30)	
* 154	A-7072-794-A	LD-84P BOARD, COMPLETE (D31)	
155	3-945-884-31	SCREW	
156	3-971-319-01	SCREW (M2.6X3)	
* 157	3-956-683-11	ADAPTOR, F FITTING	
* 158	A-7072-760-A	MD-68 BOARD, COMPLETE	
* 159	A-7072-769-A	RS-67 BOARD, COMPLETE (D30)	
* 159	A-7072-799-A	RS-67P BOARD, COMPLETE (D31)	
* 160	1-661-958-11	LB-47 BOARD (D30)	
* 160	1-661-958-21	LB-47P BOARD (D31)	
161	3-946-856-01	ADAPTOR (H), CCD FITTING	
162	1-547-735-51	FILTER BLOCK, OPTICAL	
163	3-960-149-01	RUBBER (3), SEAL	
164	A-7030-370-A	CCD BLOCK ASSY (AUTO) (D30)	
164	A-7030-371-A	CCD BLOCK ASSY (AUTO) (D31)	
* 165	A-7072-771-A	CD-154 BOARD, COMPLETE (D30)	
* 165	A-7072-801-A	CD-154P BOARD, COMPLETE (D31)	
166	3-947-268-01	TITE (2), +B TAPPING (P)	
167	1-500-227-11	BEAD, FERRITE	
168	1-657-183-11	PC BOARD, FP-314 FLEXIBLE	
169	1-777-299-11	CABLE, FLEXIBLE FLAT (FFC-180)	
170	1-777-303-11	CABLE, FLEXIBLE FLAT (FFC-187)	
171	1-956-269-11	HARNESS, VA-54	
172	1-777-301-11	CABLE, FLEXIBLE FLAT (FFC-185)	
173	1-777-300-11	CABLE, FLEXIBLE FLAT (FFC-184)	
174	1-547-716-11	LENS, ZOOM (VCL-5412WA)	
175	3-973-270-01	SPACER, LENS	
176	3-973-269-01	SPACER, LB	
177	3-849-226-01	CLOTH, UNWEAVED (25X6X0.5)	

6-2. ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ, for example:
  uA.. : μA.. uPA.. : μPA..
  uPB.. : μPB.. uPC.. : μPC.. uPD.. : μPD..
- CAPACITORS
  uF : μF
- COILS
  uH : μH

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description				Remark
*	A-7072-761-A	AT-21 BOARD, COMPLETE (D30)				
*	A-7072-791-A	AT-21P BOARD, COMPLETE (D31)				
		**********				
		(Ref.No.1,000 series)				
		< CAPACITOR >				
C801	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C802	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C803	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C804	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C805	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C830	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
		< CONNECTOR >				
CN845	1-691-519-11	CONNECTOR, BOARD TO BOARD 30P				
CN893	1-766-350-21	CONNECTOR, FFC/EPC (ZIF) 20P				
CN894	1-580-789-21	PIN, CONNECTOR (SMD) 6P				
		< DIODE >				
D801	8-719-812-41	LED TLR124				
D802	8-719-421-59	DIODE MA3130WA-TX				
D803	8-719-421-59	DIODE MA3130WA-TX				
D804	8-719-421-59	DIODE MA3130WA-TX				
D805	8-719-421-59	DIODE MA3130WA-TX				
D806	8-719-422-91	DIODE MA8091				
D807	8-719-421-59	DIODE MA3130WA-TX				
D808	8-719-421-59	DIODE MA3130WA-TX				
D809	8-719-421-59	DIODE MA3130WA-TX				
		< IC >				
IC801	8-759-391-16	IC CXD8497R				
IC802	8-759-391-15	IC HD6437034				
IC803	8-759-278-57	IC AK6420HF-E2				
IC804	8-759-438-74	IC TC74AC05AF(EL)				
		< COIL >				
L801	1-412-058-11	INDUCTOR CHIP 10uH				
L802	1-412-058-11	INDUCTOR CHIP 10uH				
L803	1-412-058-11	INDUCTOR CHIP 10uH				

Ref. No.	Part No.	Description				Remark
		< TRANSISTOR >				
Q801	8-729-029-14	TRANSISTOR DTC144EUA-T106				
Q802	8-729-420-12	TRANSISTOR XN4213				
Q803	8-729-420-12	TRANSISTOR XN4213				
		< RESISTOR >				
R801	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R802	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R803	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R804	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R805	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R810	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R812	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R813	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R814	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R815	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R816	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R817	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R818	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R819	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R820	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R825	1-216-864-11	METAL CHIP	0	5%	1/16W	
R826	1-216-864-11	METAL CHIP	0	5%	1/16W	
R827	1-216-864-11	METAL CHIP	0	5%	1/16W	
R828	1-216-864-11	METAL CHIP	0	5%	1/16W	
R829	1-216-864-11	METAL CHIP	0	5%	1/16W	
R830	1-216-864-11	METAL CHIP	0	5%	1/16W	
R831	1-216-864-11	METAL CHIP	0	5%	1/16W	
R832	1-216-864-11	METAL CHIP	0	5%	1/16W	
R833	1-216-864-11	METAL CHIP	0	5%	1/16W	
R834	1-216-864-11	METAL CHIP	0	5%	1/16W	
R835	1-216-864-11	METAL CHIP	0	5%	1/16W	
R836	1-216-814-11	METAL CHIP	270	5%	1/16W	
R837	1-500-113-11	BEAD, FERRITE (CHIP)				
R838	1-500-113-11	BEAD, FERRITE (CHIP)				
R839	1-500-113-11	BEAD, FERRITE (CHIP)				
R840	1-216-864-11	METAL CHIP	0	5%	1/16W	
R841	1-216-864-11	METAL CHIP	0	5%	1/16W	
R842	1-216-864-11	METAL CHIP	0	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R843	1-216-864-11	METAL CHIP	0	5%	1/16W	
		< VIBRATOR >				
X801	1-579-553-11	VIBRATOR (12MHz)				
**********						
*	A-7072-771-A	CD-154 BOARD, COMPLETE (D30)				
*	A-7072-801-A	CD-154P BOARD, COMPLETE (D31)				
		**********				
		(Ref.No.1,000 series)				
		< CAPACITOR >				
C891	1-135-214-21	TANTAL. CHIP	4.7uF	20%	20V	
C892	1-135-210-11	TANTALUM CHIP	4.7uF	20%	10V	
C894	1-164-346-11	CERAMIC CHIP	1uF		16V	
C895	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C896	1-104-908-11	TANTAL. CHIP	47uF	20%	4V	
		< CONNECTOR >				
CN891	1-750-340-21	CONNECTOR, FFC/EPC (ZIF) 16P				
		< COIL >				
L891	1-412-963-11	INDUCTOR 100uH				
		< TRANSISTOR >				
Q891	8-729-232-86	TRANSISTOR 2SK1875				
Q892	8-729-117-73	TRANSISTOR 2SC4178-F14				
		< RESISTOR >				
R892	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R893	1-216-840-11	METAL CHIP	39K	5%	1/16W	
R894	1-216-820-11	METAL CHIP	820	5%	1/16W	
R895	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R896	1-216-809-11	METAL CHIP	100	5%	1/16W	
R897	1-216-833-11	METAL CHIP	10K	5%	1/16W	
**********						
*	A-7072-762-A	ID-11 BOARD, COMPLETE (D30)				
*	A-7072-792-A	ID-11P BOARD, COMPLETE (D31)				
		**********				
		(Ref.No.2,000 series)				
		< CAPACITOR >				
C101	1-163-025-11	CERAMIC CHIP	0.001uF		50V	
C137	1-165-319-11	CERAMIC CHIP	0.1uF		50V	
C138	1-165-319-11	CERAMIC CHIP	0.1uF		50V	
C139	1-165-319-11	CERAMIC CHIP	0.1uF		50V	
C141	1-104-851-11	TANTAL. CHIP	10uF	20%	10V	
C143	1-104-913-11	TANTAL. CHIP	10uF	20%	16V	

Ref. No.	Part No.	Description			Remark
C147	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C148	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C149	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C151	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C152	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C153	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C154	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C155	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C162	1-124-557-11	ELECT	1000uF	20%	25V
C168	1-104-919-11	TANTAL. CHIP	10uF	20%	25V
C169	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C170	1-164-346-11	CERAMIC CHIP	1uF		16V
C171	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C172	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C173	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C174	1-135-227-11	TANTAL. CHIP	100uF	20%	6.3V
C175	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C176	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V
C177	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C178	1-104-753-11	TANTAL. CHIP	47uF	20%	6.3V
C179	1-104-753-11	TANTAL. CHIP	47uF	20%	6.3V
C180	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C181	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C187	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C188	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C189	1-104-753-11	TANTAL. CHIP	47uF	20%	6.3V
C190	1-162-638-11	CERAMIC CHIP	1uF		16V
C220	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
		< CONNECTOR >			
CN102	1-580-057-11	PIN, CONNECTOR 4P			
CN103	1-573-929-11	CONNECTOR, FFC/FPC (ZIF) 20P			
CN104	1-573-929-11	CONNECTOR, FFC/FPC (ZIF) 20P			
* CN105	1-770-469-21	PIN, CONNECTOR (PC BOARD) 2P			
CN106	1-691-486-11	CONNECTOR, FFC/FPC 7P			
* CN108	1-764-177-11	PIN, CONNECTOR (SMD)(1.5MM) 7P			
CN109	1-750-352-11	CONNECTOR, FFC/FPC (ZIF) 14P			
* CN110	1-750-005-11	PIN, CONNECTOR (PC BOARD) 4P			
		< DIODE >			
D101	8-719-421-59	DIODE MA3130WA-TX			
D102	8-719-421-59	DIODE MA3130WA-TX			
D103	8-719-421-59	DIODE MA3130WA-TX			
D104	8-719-404-49	DIODE MA111			
D105	8-719-404-49	DIODE MA111			
D106	8-719-027-50	DIODE MA142WK			
D109	8-719-421-59	DIODE MA3130WA-TX			
D110	8-719-421-59	DIODE MA3130WA-TX			
D112	8-719-050-90	DIODE MA736-TX			

ID-11/11P

Ref. No.	Part No.	Description	Remark
D113	8-719-050-90	DIODE MA736-TX	
D114	8-719-050-90	DIODE MA736-TX	
D115	8-719-050-90	DIODE MA736-TX	
D116	8-719-050-90	DIODE MA736-TX	
D117	8-719-050-90	DIODE MA736-TX	
D118	8-719-050-90	DIODE MA736-TX	
D119	8-719-050-90	DIODE MA736-TX	
D121	8-719-422-91	DIODE MA8091	
D151	8-719-820-41	DIODE 1SS302	
D152	8-719-027-50	DIODE MA142WK	
D153	8-719-421-59	DIODE MA3130WA-TX	
D154	8-719-421-59	DIODE MA3130WA-TX	
D155	8-719-422-91	DIODE MA8091	
D156	8-719-027-50	DIODE MA142WK	
D157	8-719-421-59	DIODE MA3130WA-TX	
D158	8-719-421-59	DIODE MA3130WA-TX	
D159	8-719-421-59	DIODE MA3130WA-TX	
D160	8-719-421-59	DIODE MA3130WA-TX	
D161	8-719-820-41	DIODE 1SS302	
D162	8-719-421-33	DIODE MA147	
D163	8-719-421-27	DIODE MA728	
D164	8-719-421-59	DIODE MA3130WA-TX	
D165	8-719-421-59	DIODE MA3130WA-TX	
D166	8-719-421-59	DIODE MA3130WA-TX	
D167	8-719-421-59	DIODE MA3130WA-TX	
D168	8-719-422-91	DIODE MA8091	
D169	8-719-422-91	DIODE MA8091	
D170	8-719-422-91	DIODE MA8091	
		< FUSE >	
⚠F101	1-533-380-21	FUSE, CHIP (1A/12V) (D30)	
⚠F102	1-533-380-21	FUSE, CHIP (1A/12V) (D30)	
⚠F103	1-533-380-21	FUSE, CHIP (1A/12V) (D30)	
		< IC >	
IC101	8-759-711-58	IC NJM78L05UA	
IC102	8-759-242-74	IC TC7W04F	
IC103	8-759-259-77	IC PQ20VZ5U	
IC104	8-759-252-59	IC MAX202CSE	
IC105	8-759-354-60	IC TA8435H	
IC106	8-759-354-60	IC TA8435H	
IC107	8-759-998-71	IC BA3308F	
IC109	8-759-242-66	IC TC4W66F	
IC110	8-759-711-58	IC NJM78L05UA	
		< JACK >	
J101	1-580-288-11	JACK, DC (POLARITY UNIFIED TYPE)	(DC IN 13.5V)
J102	1-573-112-11	SOCKET, CONNECTOR 8P (VISCA IN)	
J103	1-573-112-11	SOCKET, CONNECTOR 8P (VISCA OUT)	
J104	1-566-849-11	CONNECTOR, (S) TERMINAL 4P (S VIDEO OUT)	
J105	1-580-441-31	JACK, PIN 2P (VIDEO/AUDIO OUT)	
		< COIL >	
L102	1-414-226-21	INDUCTOR, FERRITE BEAD	
L103	1-414-226-21	INDUCTOR, FERRITE BEAD	
L104	1-414-226-21	INDUCTOR, FERRITE BEAD	
L105	1-414-226-21	INDUCTOR, FERRITE BEAD	
L106	1-414-081-11	INDUCTOR 33uH	
L107	1-414-226-21	INDUCTOR, FERRITE BEAD	
L108	1-414-226-21	INDUCTOR, FERRITE BEAD	
L109	1-414-226-21	INDUCTOR, FERRITE BEAD	
L110	1-414-226-21	INDUCTOR, FERRITE BEAD	
L111	1-414-078-11	INDUCTOR 10uH	
L112	1-414-078-11	INDUCTOR 10uH	
L113	1-500-113-11	BEAD, FERRITE (CHIP)	
L114	1-500-113-11	BEAD, FERRITE (CHIP)	
L115	1-500-113-11	BEAD, FERRITE (CHIP)	
L116	1-500-113-11	BEAD, FERRITE (CHIP)	
L117	1-500-113-11	BEAD, FERRITE (CHIP)	
L118	1-500-113-11	BEAD, FERRITE (CHIP)	
L119	1-500-113-11	BEAD, FERRITE (CHIP)	
L120	1-500-113-11	BEAD, FERRITE (CHIP)	
L121	1-500-113-11	BEAD, FERRITE (CHIP)	
L122	1-500-113-11	BEAD, FERRITE (CHIP)	
L123	1-500-113-11	BEAD, FERRITE (CHIP)	
L124	1-500-113-11	BEAD, FERRITE (CHIP)	
L125	1-500-113-11	BEAD, FERRITE (CHIP)	
L126	1-500-113-11	BEAD, FERRITE (CHIP)	
L127	1-500-113-11	BEAD, FERRITE (CHIP)	
		< IC LINK >	
⚠PS101	1-533-400-11	LINK, CHIP IC (1A/60V) (D31)	
⚠PS102	1-533-400-11	LINK, CHIP IC (1A/60V) (D31)	
⚠PS103	1-533-400-11	LINK, CHIP IC (1A/60V) (D31)	
		< TRANSISTOR >	
Q101	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q102	8-729-029-14	TRANSISTOR DTC144EUA-T106	
Q105	8-729-029-14	TRANSISTOR DTC144EUA-T106	
Q106	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q107	8-729-029-14	TRANSISTOR DTC144EUA-T106	
Q108	8-729-029-14	TRANSISTOR DTC144EUA-T106	
Q109	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q110	8-729-905-38	TRANSISTOR 2SC4081T106R	
Q112	8-729-202-38	TRANSISTOR 2SC3326N-A	
Q113	8-729-202-38	TRANSISTOR 2SC3326N-A	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description				Remark
Q114	8-729-026-53	TRANSISTOR	2SA1576A-T106-QR			
Q116	8-729-202-38	TRANSISTOR	2SC3326N-A			
Q118	8-729-905-38	TRANSISTOR	2SC4081T106R			
Q119	8-729-029-14	TRANSISTOR	DTC144EUA-T106			
Q120	8-729-029-14	TRANSISTOR	DTC144EUA-T106			
Q121	8-729-029-14	TRANSISTOR	DTC144EUA-T106			
Q122	8-729-029-14	TRANSISTOR	DTC144EUA-T106			
Q123	8-729-029-14	TRANSISTOR	DTC144EUA-T106			
		< RESISTOR >				
R102	1-216-049-11	METAL GLAZE	1K	5%	1/10W	
R103	1-216-815-11	METAL CHIP	330	5%	1/16W	
R112	1-216-864-11	METAL CHIP	0	5%	1/16W	
R113	1-216-864-11	METAL CHIP	0	5%	1/16W	
R114	1-216-864-11	METAL CHIP	0	5%	1/16W	
R115	1-216-864-11	METAL CHIP	0	5%	1/16W	
R117	1-216-864-11	METAL CHIP	0	5%	1/16W	
R118	1-216-864-11	METAL CHIP	0	5%	1/16W	
R119	1-216-864-11	METAL CHIP	0	5%	1/16W	
R120	1-216-864-11	METAL CHIP	0	5%	1/16W	
R121	1-216-864-11	METAL CHIP	0	5%	1/16W	
R122	1-216-864-11	METAL CHIP	0	5%	1/16W	
R123	1-216-864-11	METAL CHIP	0	5%	1/16W	
R124	1-216-864-11	METAL CHIP	0	5%	1/16W	
R125	1-216-864-11	METAL CHIP	0	5%	1/16W	
R127	1-216-864-11	METAL CHIP	0	5%	1/16W	
R128	1-216-864-11	METAL CHIP	0	5%	1/16W	
R129	1-216-864-11	METAL CHIP	0	5%	1/16W	
R130	1-216-864-11	METAL CHIP	0	5%	1/16W	
R131	1-216-864-11	METAL CHIP	0	5%	1/16W	
R132	1-216-864-11	METAL CHIP	0	5%	1/16W	
R133	1-216-864-11	METAL CHIP	0	5%	1/16W	
R134	1-216-864-11	METAL CHIP	0	5%	1/16W	
R135	1-216-864-11	METAL CHIP	0	5%	1/16W	
R136	1-216-864-11	METAL CHIP	0	5%	1/16W	
R137	1-216-864-11	METAL CHIP	0	5%	1/16W	
R138	1-216-864-11	METAL CHIP	0	5%	1/16W	
R139	1-216-864-11	METAL CHIP	0	5%	1/16W	
R140	1-216-864-11	METAL CHIP	0	5%	1/16W	
R144	1-216-815-11	METAL CHIP	330	5%	1/16W	
R145	1-500-113-11	BEAD, FERRITE (CHIP)				
R146	1-500-113-11	BEAD, FERRITE (CHIP)				
R147	1-500-113-11	BEAD, FERRITE (CHIP)				
R152	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R153	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R155	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R156	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R159	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R160	1-216-855-11	METAL CHIP	680K	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R163	1-216-049-11	METAL GLAZE	1K	5%	1/10W	
R164	1-216-049-11	METAL GLAZE	1K	5%	1/10W	
R169	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R170	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R171	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R172	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R173	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R174	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R175	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R176	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R177	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R178	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R183	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R184	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R185	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R186	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R187	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R188	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R189	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R190	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R191	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R192	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R193	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R194	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R195	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R196	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R197	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R198	1-216-150-00	METAL GLAZE	10	5%	1/8W	
R203	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R204	1-216-804-11	METAL CHIP	39	5%	1/16W	
R205	1-216-804-11	METAL CHIP	39	5%	1/16W	
R206	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R207	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R208	1-216-809-11	METAL CHIP	100	5%	1/16W	
R209	1-216-834-11	METAL CHIP	12K	5%	1/16W	
R210	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R211	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R212	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R213	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R214	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R215	1-216-049-11	METAL GLAZE	1K	5%	1/10W	
R216	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R217	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R218	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R219	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R220	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R221	1-216-818-11	METAL CHIP	560	5%	1/16W	
R222	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R223	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R224	1-216-864-11	METAL CHIP	0	5%	1/16W	

ID-11/11P **LB-47/47P** **LD-84/84P**

Ref. No.	Part No.	Description				Remark
R238	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R239	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R240	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R241	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R242	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R243	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R244	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R245	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R246	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R253	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R257	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R258	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R259	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R260	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R262	1-216-841-11	METAL CHIP	47K	5%	1/16W	
		< SWITCH >				
S101	1-553-977-00	SWITCH, SLIDE (IR OUT)				
		< TEST PIN >				
TP101	1-535-757-11	CHIP, CHECKER				
TP102	1-535-757-11	CHIP, CHECKER				
TP103	1-535-757-11	CHIP, CHECKER				
TP104	1-535-757-11	CHIP, CHECKER				
TP105	1-535-757-11	CHIP, CHECKER				
TP106	1-535-757-11	CHIP, CHECKER				
TP107	1-535-757-11	CHIP, CHECKER				
TP108	1-535-757-11	CHIP, CHECKER				
**********						
*	1-661-958-11	LB-47 BOARD (D30)				
*	1-661-958-21	LB-47P BOARD (D31)				
		**********				
		(Ref.No.2,000 series)				
		< BATTERY >				
BT401	1-528-694-11	BATTERY, V/L RICHARGEABL				
		< CONNECTOR >				
CN403	1-573-522-21	CONNECTOR, BOARD TO BOARD 14P				
**********						
*	A-7072-764-A	LD-84 BOARD, COMPLETE (D30)				
*	A-7072-794-A	LD-84P BOARD, COMPLETE (D31)				
		**********				
		(Ref.No.2,000 series)				
		< CAPACITOR >				
C701	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C702	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	

Ref. No.	Part No.	Description				Remark
C703	1-162-974-11	CERAMIC CHIP	0.01uF			50V
C704	1-162-974-11	CERAMIC CHIP	0.01uF			50V
C705	1-162-964-11	CERAMIC CHIP	0.001uF	10%		50V
C706	1-164-156-11	CERAMIC CHIP	0.1uF			25V
C707	1-162-974-11	CERAMIC CHIP	0.01uF			50V
C708	1-104-752-11	TANTAL. CHIP	33uF	20%		6.3V
C709	1-164-156-11	CERAMIC CHIP	0.1uF			25V
C710	1-162-974-11	CERAMIC CHIP	0.01uF			50V
C711	1-164-156-11	CERAMIC CHIP	0.1uF			25V
C712	1-162-974-11	CERAMIC CHIP	0.01uF			50V
C713	1-164-156-11	CERAMIC CHIP	0.1uF			25V
C714	1-135-181-21	TANTALUM CHIP	4.7uF	20%		6.3V
C715	1-162-974-11	CERAMIC CHIP	0.01uF			50V
		< CONNECTOR >				
CN701	1-766-833-21	CONNECTOR, FFC/FPC (ZIF) 21P				
CN702	1-691-539-11	CONNECTOR, BOARD TO BOARD 30P				
		< IC >				
IC701	8-759-701-24	IC NJM3414M				
IC702	8-759-351-46	IC MPC17A34RVMEL				
IC703	8-759-058-50	IC XRA10324AF				
IC704	8-752-365-65	IC CXD2126N-T4				
IC705	8-759-209-15	IC TC4SU69F				
		< COIL >				
L701	1-412-062-11	INDUCTOR CHIP 47uH				
L702	1-412-058-11	INDUCTOR CHIP 10uH				
L703	1-412-058-11	INDUCTOR CHIP 10uH				
		< TRANSISTOR >				
Q701	8-729-230-63	TRANSISTOR 2SC4116-YG				
Q702	8-729-015-76	TRANSISTOR UN5211				
		< RESISTOR >				
R701	1-216-809-11	METAL CHIP	100	5%	1/16W	
R702	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R703	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R704	1-216-848-11	METAL CHIP	180K	5%	1/16W	
R705	1-216-855-11	METAL CHIP	680K	5%	1/16W	
R706	1-216-848-11	METAL CHIP	180K	5%	1/16W	
R707	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R708	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R709	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R710	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R711	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R712	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R713	1-216-820-11	METAL CHIP	820	5%	1/16W	
R714	1-216-837-11	METAL CHIP	22K	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R715	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R716	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R717	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R718	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R719	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R720	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R721	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R722	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R723	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R724	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R725	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R726	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R727	1-218-865-11	METAL CHIP	5.6K	0.50%	1/16W	
R728	1-218-855-11	METAL CHIP	2.2K	0.50%	1/16W	
R729	1-216-864-11	METAL CHIP	0	5%	1/16W	(D31)
R730	1-216-864-11	METAL CHIP	0	5%	1/16W	(D30)
**********						
*	1-661-955-11	LI-52 BOARD (D30)				
*	1-661-955-21	LI-52P BOARD (D31)				
		**********				
		(Ref.No.2,000 series)				
		< CONNECTOR >				
CN341	1-750-352-11	CONNECTOR, FFC/FPC (ZIF) 14P				
* CN342	1-750-005-11	PIN, CONNECTOR (PC BOARD) 4P				
* CN343	1-580-056-21	PIN, CONNECTOR 3P				
		< PHOTO INTERRUPTER >				
PH341	8-749-012-73	PHONE INTERRUPTER TLP830				
**********						
*	1-661-956-11	LI-55 BOARD (D30)				
*	1-661-956-21	LI-55P BOARD (D31)				
		**********				
		(Ref.No.2,000 series)				
		< CONNECTOR >				
CN361	1-580-057-11	PIN, CONNECTOR 4P				
		< PHOTO INTERRUPTER >				
PH361	8-749-012-73	PHONE INTERRUPTER TLP830				
PH362	8-749-012-73	PHONE INTERRUPTER TLP830				
**********						

Ref. No.	Part No.	Description				Remark
*	1-661-957-11	LI-59 BOARD (D30)				
*	1-661-957-21	LI-59P BOARD (D31)				
		**********				
		(Ref.No.2,000 series)				
		< CONNECTOR >				
* CN351	1-580-056-21	PIN, CONNECTOR 3P				
		< PHOTO INTERRUPTER >				
PH351	8-749-012-73	PHONE INTERRUPTER TLP830				
**********						
*	A-7072-760-A	MD-68 BOARD, COMPLETE				
		**********				
		(Ref.No.1,000 series)				
		< CAPACITOR >				
C102	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C103	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C104	1-107-685-11	TANTAL. CHIP	15uF	20%	6.3V	
C105	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C106	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C107	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C108	1-135-091-00	TANTALUM CHIP	1uF	20%	16V	
C109	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C110	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C111	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C112	1-104-851-11	TANTAL. CHIP	10uF	20%	10V	
C113	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C114	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C115	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V	
C116	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C117	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C118	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C119	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C120	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C121	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C122	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C123	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C124	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C125	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
C126	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C127	1-162-919-11	CERAMIC CHIP	22PF	5%	50V	
C128	1-162-918-11	CERAMIC CHIP	18PF	5%	50V	
C129	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C130	1-162-974-11	CERAMIC CHIP	0.01uF		50V	

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Ref. No.	Part No.	Description	Remark
		< CONNECTOR >	
* CN101	1-580-056-21	PIN, CONNECTOR 3P	
CN102	1-774-201-21	CONNECTOR, FFC/FPC 25P	
CN105	1-766-350-21	CONNECTOR, FFC/EPC (ZIF) 20P	
CN106	1-774-201-21	CONNECTOR, FFC/FPC 25P	
		< DIODE >	
D104	8-719-027-50	DIODE MA142WK	
D106	8-719-421-27	DIODE MA728	
D107	8-719-421-27	DIODE MA728	
D108	8-719-422-91	DIODE MA8091	
D109	8-719-422-91	DIODE MA8091	
D110	8-719-422-91	DIODE MA8091	
		< IC >	
IC101	8-759-446-59	IC MB89098RPFV-G-146-BND	
IC102	8-759-278-57	IC AK6420HF-E2	
IC103	8-759-295-62	IC S-8423DFS-T2	
IC104	8-759-059-05	IC TL1596CPW	
IC105	8-759-259-77	IC PQ20VZ5U	
IC106	8-759-336-96	IC uPD6461GS-814-GLG-E2	
IC107	8-759-031-58	IC SC7SU04F	
		< COIL >	
L101	1-414-081-11	INDUCTOR 33uH	
L102	1-414-078-11	INDUCTOR 10uH	
		< IC LINK >	
⚠PS101	1-576-123-21	LINK, IC (0.8A) CCP2E20	
		< TRANSISTOR >	
Q104	8-729-029-14	TRANSISTOR DTC144EUA-T106	
		< RESISTOR >	
R101	1-216-295-91	CONDUCTOR, CHIP (2012)	
R108	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R109	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R110	1-216-811-11	METAL CHIP 150 5% 1/16W	
R111	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R112	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R113	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R114	1-216-851-11	METAL CHIP 330K 5% 1/16W	
R115	1-216-817-11	METAL CHIP 470 5% 1/16W	
R116	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R117	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R118	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R119	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R120	1-216-864-11	METAL CHIP 0 5% 1/16W	
R121	1-216-826-11	METAL CHIP 2.7K 5% 1/16W	
R123	1-216-848-11	METAL CHIP 180K 5% 1/16W	
R124	1-216-809-11	METAL CHIP 100 5% 1/16W	
R125	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R126	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R127	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R128	1-216-826-11	METAL CHIP 2.7K 5% 1/16W	
R130	1-216-864-11	METAL CHIP 0 5% 1/16W	
R131	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R134	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R135	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R136	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R138	1-216-849-11	METAL CHIP 220K 5% 1/16W	
R139	1-216-853-11	METAL CHIP 470K 5% 1/16W	
R140	1-216-851-11	METAL CHIP 330K 5% 1/16W	
R142	1-216-864-11	METAL CHIP 0 5% 1/16W	
R144	1-216-864-11	METAL CHIP 0 5% 1/16W	
R145	1-216-864-11	METAL CHIP 0 5% 1/16W	
R151	1-216-864-11	METAL CHIP 0 5% 1/16W	
R152	1-216-864-11	METAL CHIP 0 5% 1/16W	
R153	1-216-864-11	METAL CHIP 0 5% 1/16W	
R154	1-216-864-11	METAL CHIP 0 5% 1/16W	
R155	1-216-864-11	METAL CHIP 0 5% 1/16W	
R156	1-216-864-11	METAL CHIP 0 5% 1/16W	
R157	1-216-864-11	METAL CHIP 0 5% 1/16W	
R158	1-216-864-11	METAL CHIP 0 5% 1/16W	
R159	1-216-864-11	METAL CHIP 0 5% 1/16W	
R160	1-216-864-11	METAL CHIP 0 5% 1/16W	
R161	1-216-864-11	METAL CHIP 0 5% 1/16W	
R162	1-216-864-11	METAL CHIP 0 5% 1/16W	
R163	1-216-864-11	METAL CHIP 0 5% 1/16W	
R164	1-216-864-11	METAL CHIP 0 5% 1/16W	
R165	1-216-864-11	METAL CHIP 0 5% 1/16W	
R167	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R172	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R177	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R178	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R179	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R180	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R181	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R182	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R183	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R184	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R185	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R186	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R187	1-216-821-11	METAL CHIP 1K 5% 1/16W	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description				Remark
R188	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R189	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R191	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R192	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R193	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R194	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R195	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R196	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R197	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R198	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R199	1-216-833-11	METAL CHIP	10K	5%	1/16W	
		< VIBRATOR >				
X101	1-760-458-21	VIBRATOR, CRYSTAL (32kHz)				
		< VIBRATOR >				
XTL101	1-579-369-21	VIBRATOR (10MHz)				
**********						
*	A-7072-768-A	RM-77 BOARD, COMPLETE (D30)				
	A-7072-798-A	RM-77P BOARD, COMPLETE (D31)				
		**********				
		(Ref.No.2,000 series)				
		< CAPACITOR >				
C381	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V	
C382	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V	
C383	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C384	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V	
		< CONNECTOR >				
CN381	1-691-486-11	CONNECTOR, FFC/FPC 7P				
		< DIODE >				
D381	8-719-987-33	LED GL3HS8				
D382	8-719-938-67	LED GL-3EG8				
D383	8-719-421-59	DIODE MA3130WA-TX				
D384	8-719-421-59	DIODE MA3130WA-TX				
D385	8-719-421-59	DIODE MA3130WA-TX				
		< IC >				
IC381	8-748-020-56	IC RAY CATCHER ELEMENT SBX8020A-F				
IC382	8-748-020-56	IC RAY CATCHER ELEMENT SBX8020A-F				
IC383	8-759-032-11	IC MC74HC04AF				
IC384	8-748-020-56	IC RAY CATCHER ELEMENT SBX8020A-F				
		< TRANSISTOR >				
Q381	8-729-029-14	TRANSISTOR DTC144EUA-T106				

Ref. No.	Part No.	Description				Remark
		< RESISTOR >				
R381	1-216-815-11	METAL CHIP	330	5%	1/16W	
R382	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R383	1-216-805-11	METAL CHIP	47	5%	1/16W	
R384	1-216-805-11	METAL CHIP	47	5%	1/16W	
R385	1-216-805-11	METAL CHIP	47	5%	1/16W	
**********						
*	A-7072-769-A	RS-67 BOARD, COMPLETE (D30)				
*	A-7072-799-A	RS-67P BOARD, COMPLETE (D31)				
		**********				
		(Ref.No.2,000 series)				
		< CAPACITOR >				
C401	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C402	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C403	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C404	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C405	1-162-918-11	CERAMIC CHIP	18PF	5%	50V	
C406	1-162-920-11	CERAMIC CHIP	27PF	5%	50V	
		< CONNECTOR >				
CN401	1-774-202-21	CONNECTOR, FFC/FPC 25P				
* CN402	1-691-922-11	CONNECTOR, BOARD TO BOARD 14P				
		< DIODE >				
D401	8-719-421-18	DIODE MA8033-L-TX				
D402	8-719-938-72	DIODE SB01-05CP				
D403	8-719-422-91	DIODE MA8091				
D404	8-719-421-59	DIODE MA3130WA-TX				
D405	8-719-421-59	DIODE MA3130WA-TX				
		< IC >				
IC401	8-759-149-05	IC uPD71051GB-10-3B4				
IC402	8-759-032-11	IC MC74HC04AF				
		< COIL >				
L401	1-414-081-11	INDUCTOR 33uH				
L402	1-414-081-11	INDUCTOR 33uH				
		< RESISTOR >				
R401	1-216-863-11	METAL GLAZE	3.3M	5%	1/16W	
R402	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R403	1-216-813-11	METAL CHIP	220	5%	1/16W	
R404	1-216-295-00	CONDUCTOR, CHIP		(2012)		
R407	1-216-841-11	METAL CHIP	47K	5%	1/16W	
		< SWITCH >				
S401	1-570-114-11	SWITCH, SLIDE (BACK UP)				

RS-67/67P **SW-279/279P** **VC-179**

Ref. No.	Part No.	Description			Remark
		< VIBRATOR >			
X401	1-767-169-11	VIBRATOR, CRYSTAL (100.0kHz) (D31)			
X401	1-767-169-21	VIBRATOR, CRYSTAL (153.6kHz) (D30)			
**********					
*	A-7072-770-A	SW-279 BOARD, COMPLETE (D30)			
*	A-7072-800-A	SW-279P BOARD, COMPLETE (D31)			
		**********			
		(Ref.No.2,000 series)			
		< CAPACITOR >			
C321	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C322	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C323	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C324	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C325	1-164-346-11	CERAMIC CHIP	1uF		16V
C326	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V
C327	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V
C328	1-165-319-11	CERAMIC CHIP	0.1uF		50V
		< CONNECTOR >			
* CN321	1-764-177-11	PIN, CONNECTOR (SMD)(1.5MM) 7P			
		< DIODE >			
D323	8-719-421-59	DIODE MA3130WA-TX			
		< IC >			
IC321	8-759-080-34	IC TA75W01FU			
		< JACK >			
J321	1-568-027-11	JACK, SMALL TYPE 1P (MIC)			
		< COIL >			
L321	1-543-949-11	BEAD, FERRITE (CHIP)			
L322	1-543-949-11	BEAD, FERRITE (CHIP)			
		< TRANSISTOR >			
Q321	8-729-905-38	TRANSISTOR 2SC4081T106R			
		< RESISTOR >			
R321	1-216-864-11	METAL CHIP	0	5%	1/16W
R322	1-216-864-11	METAL CHIP	0	5%	1/16W
R323	1-216-864-11	METAL CHIP	0	5%	1/16W
R324	1-216-833-11	METAL CHIP	10K	5%	1/16W
R326	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R327	1-216-838-11	METAL CHIP	27K	5%	1/16W
R328	1-216-844-11	METAL CHIP	82K	5%	1/16W

Ref. No.	Part No.	Description			Remark
R329	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R330	1-216-840-11	METAL CHIP	39K	5%	1/16W
R331	1-216-839-11	METAL CHIP	33K	5%	1/16W
R332	1-216-836-11	METAL CHIP	18K	5%	1/16W
R334	1-216-809-11	METAL CHIP	100	5%	1/16W
R335	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R336	1-216-011-00	METAL CHIP	27	5%	1/10W
R338	1-216-302-11	METAL CHIP	2.7	5%	1/10W
		< SWITCH >			
S321	1-572-078-11	SWITCH, TACTILE (DATE)			
S322	1-572-078-11	SWITCH, TACTILE (TIME)			
S323	1-554-843-11	SWITCH, SLIDE (CAMERA NO. 1/2/3)			
**********					
*	A-7072-759-A	VC-179 BOARD, COMPLETE (D30)			
*	A-7072-790-A	VC-179 BOARD, COMPLETE (D31)			
		**********			
		(Ref.No.1,000 series)			
		< CAPACITOR >			
C001	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C002	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C004	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C005	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C006	1-113-996-11	TANTAL. CHIP	220uF	20%	4V
C007	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C008	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C009	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C010	1-113-996-11	TANTAL. CHIP	220uF	20%	4V
C011	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C012	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C013	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C014	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C017	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C019	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C301	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C302	1-162-928-11	CERAMIC CHIP	120PF	5%	50V
C304	1-104-916-11	TANTAL. CHIP	6.8uF	20%	20V
C307	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C309	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C310	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C311	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C312	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C313	1-164-730-11	CERAMIC CHIP	0.0012uF	10%	50V
C315	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C316	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C317	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C318	1-162-962-11	CERAMIC CHIP	470PF	10%	50V

Ref. No.	Part No.	Description			Remark
C319	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C320	1-162-963-11	CERAMIC CHIP	680PF	10%	50V
C321	1-162-963-11	CERAMIC CHIP	680PF	10%	50V
C322	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C323	1-162-963-11	CERAMIC CHIP	680PF	10%	50V
C326	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C327	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C328	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C329	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C330	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C331	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C332	1-164-506-11	CERAMIC CHIP	4.7uF		16V
C333	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C334	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C335	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C336	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C339	1-162-638-11	CERAMIC CHIP	1uF		16V
C340	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C401	1-162-637-11	CERAMIC CHIP	0.47uF		16V
C402	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C403	1-164-346-11	CERAMIC CHIP	1uF		16V
C404	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C405	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V
C406	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C407	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C408	1-135-214-21	TANTAL. CHIP	4.7uF	20%	20V
C409	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C410	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C411	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C412	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C413	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C414	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C415	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C417	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C418	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C420	1-162-922-11	CERAMIC CHIP	39PF	5%	50V
C421	1-162-916-11	CERAMIC CHIP	12PF	5%	50V
C422	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C423	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C424	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C425	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V
C426	1-164-492-11	CERAMIC CHIP	0.15uF	10%	16V
C427	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V
C428	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C429	1-164-492-11	CERAMIC CHIP	0.15uF	10%	16V
C430	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C434	1-164-346-11	CERAMIC CHIP	1uF		16V
C435	1-164-346-11	CERAMIC CHIP	1uF		16V
C436	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V

Ref. No.	Part No.	Description			Remark
C437	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C501	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C502	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C503	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C506	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C508	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C509	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C511	1-107-685-11	TANTAL. CHIP	15uF	20%	6.3V
C512	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C514	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C515	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C516	1-164-360-11	CERAMIC CHIP	0.1uF		16V (D31)
C518	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C519	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C524	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C525	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C526	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C527	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C528	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C529	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C530	1-164-346-11	CERAMIC CHIP	1uF		16V
C531	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C532	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V

< CONNECTOR >

CN001	1-580-789-21	PIN, CONNECTOR (SMD) 6P	
CN301	1-580-055-21	PIN, CONNECTOR 2P	
CN401	1-750-340-21	CONNECTOR, FFC/EPC (ZIF) 16P	
CN501	1-691-519-11	CONNECTOR, BOARD TO BOARD 30P	
* CN502	1-691-529-11	CONNECTOR, BOARD TO BOARD 30P	
CN504	1-774-202-21	CONNECTOR, FFC/FPC 25P	

< DIODE >

D001	8-719-027-50	DIODE MA142WK
D302	8-719-027-77	DIODE MA796
D401	8-719-404-49	DIODE MA111
D402	8-719-404-49	DIODE MA111
D403	8-719-404-49	DIODE MA111
D404	8-719-404-49	DIODE MA111
D406	8-713-102-28	DIODE 1T379-04-T8A

< FILTER >

FL501	1-239-352-11	FILTER, LOW PASS

< IC >

IC001	8-752-055-95	IC CXA1409AQ
IC302	8-759-060-94	IC MB3785APFV-G-BN
IC401	8-752-372-14	IC CXD1267AN

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Ref. No.	Part No.	Description	Remark
IC402	8-752-374-25	IC CXD2415R-T4	
IC403	8-752-073-11	IC CXA2006Q-T4	
IC404	8-759-064-36	IC MB88346BPFV	
IC405	8-752-373-69	IC CXD2407BR	
IC406	8-759-331-07	IC AD43021-REEL	
IC501	8-759-278-57	IC AK6420HF-E2	
IC502	8-759-391-14	IC MC68HC11M-SC424624F	
IC503	8-752-374-94	IC CXD2150BR	
IC504	8-752-376-21	IC CXD2151AR	
IC505	8-759-288-14	IC CXD2133CR-T6	
		< COIL >	
L001	1-412-058-11	INDUCTOR CHIP 10uH	
L002	1-500-113-11	BEAD, FERRITE (CHIP)	
L003	1-500-113-11	BEAD, FERRITE (CHIP)	
L004	1-500-113-11	BEAD, FERRITE (CHIP)	
L304	1-424-653-11	COIL, CHOKE 10uH	
L305	1-424-653-11	COIL, CHOKE 10uH	
L306	1-424-674-11	COIL, CHOKE 22uH	
L307	1-424-674-11	COIL, CHOKE 22uH	
L308	1-424-674-11	COIL, CHOKE 22uH	
L309	1-412-026-11	INDUCTOR CHIP 1uH	
L310	1-412-033-11	INDUCTOR CHIP 220uH	
L311	1-412-033-11	INDUCTOR CHIP 220uH	
L313	1-412-028-11	INDUCTOR CHIP 4.7uH	
L315	1-412-028-11	INDUCTOR CHIP 4.7uH	
L401	1-412-058-11	INDUCTOR CHIP 10uH	
L402	1-414-078-11	INDUCTOR 10uH	
L403	1-412-058-11	INDUCTOR CHIP 10uH	
L404	1-414-078-11	INDUCTOR 10uH	
L405	1-414-078-11	INDUCTOR 10uH	
L501	1-412-058-11	INDUCTOR CHIP 10uH	
L502	1-414-078-11	INDUCTOR 10uH	
L503	1-414-078-11	INDUCTOR 10uH	
L504	1-414-078-11	INDUCTOR 10uH	
L505	1-412-959-11	INDUCTOR 47uH (D31)	
L505	1-412-961-11	INDUCTOR 68uH (D30)	
L506	1-414-078-11	INDUCTOR 10uH	
		< TRANSISTOR >	
Q304	8-729-106-60	TRANSISTOR 2SB1115A	
Q305	8-729-823-84	TRANSISTOR FP102	
Q306	8-729-823-84	TRANSISTOR FP102	
Q307	8-729-823-84	TRANSISTOR FP102	
Q308	8-729-403-35	TRANSISTOR UN5113	
Q401	8-729-403-27	TRANSISTOR XN4401	
Q501	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q502	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q503	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q504	8-729-420-24	TRANSISTOR 2SB1218A-QRS	

Ref. No.	Part No.	Description				Remark
		< RESISTOR >				
R001	1-216-807-11	METAL CHIP	68	5%	1/16W	
R005	1-216-807-11	METAL CHIP	68	5%	1/16W	
R006	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R007	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R008	1-216-807-11	METAL CHIP	68	5%	1/16W	
R009	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R010	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R011	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R012	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R033	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R302	1-218-865-11	METAL CHIP	5.6K	0.50%	1/16W	
R303	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R306	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R307	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R310	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R312	1-218-876-11	METAL CHIP	16K	0.50%	1/16W	
R313	1-216-834-11	METAL CHIP	12K	5%	1/16W	
R314	1-218-874-11	METAL CHIP	13K	0.50%	1/16W	
R315	1-218-891-11	METAL CHIP	68K	0.50%	1/16W	
R316	1-218-875-11	METAL CHIP	15K	0.50%	1/16W	
R318	1-218-885-11	METAL CHIP	39K	0.50%	1/16W	
R319	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R320	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R321	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R322	1-216-847-11	METAL CHIP	150K	5%	1/16W	
R323	1-218-879-11	METAL CHIP	22K	0.50%	1/16W	
R325	1-218-875-11	METAL CHIP	15K	0.50%	1/16W	
R326	1-218-873-11	METAL CHIP	12K	0.50%	1/16W	
R327	1-218-881-11	METAL CHIP	27K	0.50%	1/16W	
R329	1-218-865-11	METAL CHIP	5.6K	0.50%	1/16W	
R330	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R332	1-218-875-11	METAL CHIP	15K	0.50%	1/16W	
R333	1-216-819-11	METAL CHIP	680	5%	1/16W	
R334	1-216-864-11	METAL CHIP	0	5%	1/16W	
R335	1-218-847-11	METAL CHIP	1K	0.50%	1/16W	
R336	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R337	1-216-033-00	METAL CHIP	220	5%	1/10W	
R338	1-216-027-00	METAL CHIP	120	5%	1/10W	
R339	1-216-041-00	METAL CHIP	470	5%	1/10W	
R340	1-216-041-00	METAL CHIP	470	5%	1/10W	
R341	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R342	1-216-009-00	METAL CHIP	22	5%	1/10W	
R344	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R345	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R346	1-211-989-11	METAL GLAZE	68	0.50%	1/16W	
R401	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R402	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R403	1-216-857-11	METAL CHIP	1M	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R404	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R405	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R406	1-218-876-11	METAL CHIP	16K	0.50%	1/16W	
R407	1-218-847-11	METAL CHIP	1K	0.50%	1/16W	
R408	1-216-864-11	METAL CHIP	0	5%	1/16W	
R409	1-216-864-11	METAL CHIP	0	5%	1/16W	
R410	1-216-864-11	METAL CHIP	0	5%	1/16W	
R411	1-216-864-11	METAL CHIP	0	5%	1/16W	
R412	1-216-811-11	METAL CHIP	150	5%	1/16W	
R413	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R414	1-216-803-11	METAL CHIP	33	5%	1/16W	
R415	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R417	1-216-864-11	METAL CHIP	0	5%	1/16W	(D31)
R420	1-216-864-11	METAL CHIP	0	5%	1/16W	
R501	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R502	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R503	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R504	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R505	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R506	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R507	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R508	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R509	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R510	1-216-821-11	METAL CHIP	1K	5%	1/16W	(D31)
R511	1-216-844-11	METAL CHIP	82K	5%	1/16W	(D31)
R512	1-216-864-11	METAL CHIP	0	5%	1/16W	(D30)
R513	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R514	1-216-819-11	METAL CHIP	680	5%	1/16W	
R515	1-216-863-11	METAL GLAZE	3.3M	5%	1/16W	(D31)
R516	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R517	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R518	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R519	1-216-819-11	METAL CHIP	680	5%	1/16W	
R520	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R521	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R522	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R523	1-216-815-11	METAL CHIP	330	5%	1/16W	
R524	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R525	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R526	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R527	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R528	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R529	1-216-817-11	METAL CHIP	470	5%	1/16W	(D31)
R529	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	(D30)
R530	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R531	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R532	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R533	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R534	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R536	1-216-864-11	METAL CHIP	0	5%	1/16W	
R538	1-216-864-11	METAL CHIP	0	5%	1/16W	
		< TRANSFORMER >				
T301	1-450-976-11	TRANSFORMER, CONVERTER				
		< VIBRATOR >				
X401	1-760-320-11	VIBRATOR, CRYSTAL (28.6363MHz) (D30)				
X401	1-760-321-11	VIBRATOR, CRYSTAL (28.375MHz) (D31)				
X501	1-760-081-21	VIBRATOR, CERAMIC (24MHz)				

****

MISCELLANEOUS
****

11	1-777-304-11	CABLE, FLEXIBLE FLAT (FFC-188)
72	1-956-267-11	HARNESS, IL-52
76	1-956-268-11	HARNESS, IS-55
78	1-777-302-11	CABLE, FLEXIBLE FLAT (FFC-186)
83	1-956-271-11	HARNESS, PW-58
135	1-956-270-11	HARNESS, LL-51
162	1-547-735-51	FILTER BLOCK, OPTICAL
167	1-500-227-11	BEAD, FERRITE
168	1-657-183-11	PC BOARD, FP-314 FLEXIBLE
169	1-777-299-11	CABLE, FLEXIBLE FLAT (FFC-180)
170	1-777-303-11	CABLE, FLEXIBLE FLAT (FFC-187)
171	1-956-269-11	HARNESS, VA-54
172	1-777-301-11	CABLE, FLEXIBLE FLAT (FFC-185)
173	1-777-300-11	CABLE, FLEXIBLE FLAT (FFC-184)
174	1-547-716-11	LENS, ZOOM (VCL-5412WA)
M1	1-698-797-11	MOTOR, STEPPING (PAN)
M2	1-698-797-21	MOTOR, STEPPING (TILT)
S1	1-762-025-11	SWITCH, POWER (POWER)

****

Ref. No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS	
		******************************	
⚠	1-473-789-11	ADAPTOR, AC (AC-EV2) (D30)	
⚠	1-473-790-11	ADAPTOR, AC (AC-EV3) (D31)	
	1-574-039-21	CORD, CONNECTION (AV CABLE)	
	3-856-663-01	MANUAL, INSTRUCTION (JAPANESE/ENGLISH)	
*	3-972-148-01	INDIVIDUAL CARTON (D30)	
*	3-972-149-01	CUSHION (UPPER)	
*	3-972-150-01	CUSHION (LOWER)	
*	3-972-153-01	INDIVIDUAL CARTON (D31)	
*	3-972-546-01	TAPE, FIXED	
	4-978-977-01	LID, BATTERY CASE	
	8-917-560-90	REMOTE COMMANDER, SONY RMT-D30	
**********			
		**********	
		HARDWARE LIST	
		**********	
#1	7-682-545-04	SCREW (3X4) (G), TAPPING,(+) P	
#2	7-624-102-04	STOP RING 1.5, TYPE -E	
#3	7-624-104-04	STOP RING 2.0, TYPE -E	
#4	7-624-106-04	STOP RING 3.0, TYPE -E	
#5	7-682-647-09	SCREW +PS 3X6	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety.
Replace only with part number specified.

SECTION 7
ADJUSTMENTS

7-1. PREPARATION FOR ADJUSTMENT

7-1-1. List of Servicing Jigs

• Oscilloscope • Regulated power supply • Audio generator • Audio level meter
• Color monitor • Vectorscope • Desk-top calculator • Digital voltmeter

Ref. No.	Name	Part No.	Use
J-1	Filter for color temperature correction (C14)	J-6080-058-A	Auto white balance adjustment/check White balance adjustment/check
J-2	ND filter 1.0	J-6080-808-A	White balance check
	ND filter 0.3	J-6080-818-A	White balance check
J-3	Pattern box PTB-450	J-6082-200-A	
J-4	Color chart for pattern box	J-6020-250-A	
J-5	Siemens star	J-6080-875-A	For checking the flange back
J-6	Extension cable (30P, 0.8mm)	J-6082-189-A	For extension between LD-84/84P board (CN702) and VC-179 board (CN501), AT-21/21P board (CN845) and VC-179 board (CN502).
J-7	Adjusting remote commander (*1) (RM-95 remodeled partly)	J-6082-053-B	
J-8	Extension cable 3	J-6082-291-A	For adjusting remote commander (J-7)
J-9	Video/S video out cable	J-6082-293-A	For checking the video signal
J-10	DC-57 harness (2P)	1-951-473-11	For DC-supply to VC-179 board (CN301)
J-11	RS-232C cable (8P DIN-8P DIN)	1-590-879-11	For connection between VISCA IN JACK and Macintosh PC
J-12	RS-232C cable (8P DIN-25P DSUB)	1-751-195-11 SMF-532A (79-6363-00)	For connection between VISCA IN JACK and NEC PC98
J-13	RS-232C cable (8P DIN-9P DSUB female)	1-690-391-21 SMF-533 (48-5233-00)	For connection between VISCA IN JACK and IBM PC, Quarter-L
J-14	VISCA Control Software	J-6082-297-A	For IBM PC/NEC PC98
		J-6082-296-A	For Macintosh PC
	AC Adaptor (Output voltage: 13.5Vdc)	1-473-789-11	AC-EV2 (AC120V)
		1-473-790-11	AC-EV3 (AC220-230V)
	Remote commander	8-917-560-90	RMT-D30

* 1 Microcomputer IC in the adjusting remote commander except for μPD7503G-C56-12 (8-759-148-35) does not allow the page selecting. Replace the microcomputer in such a case.

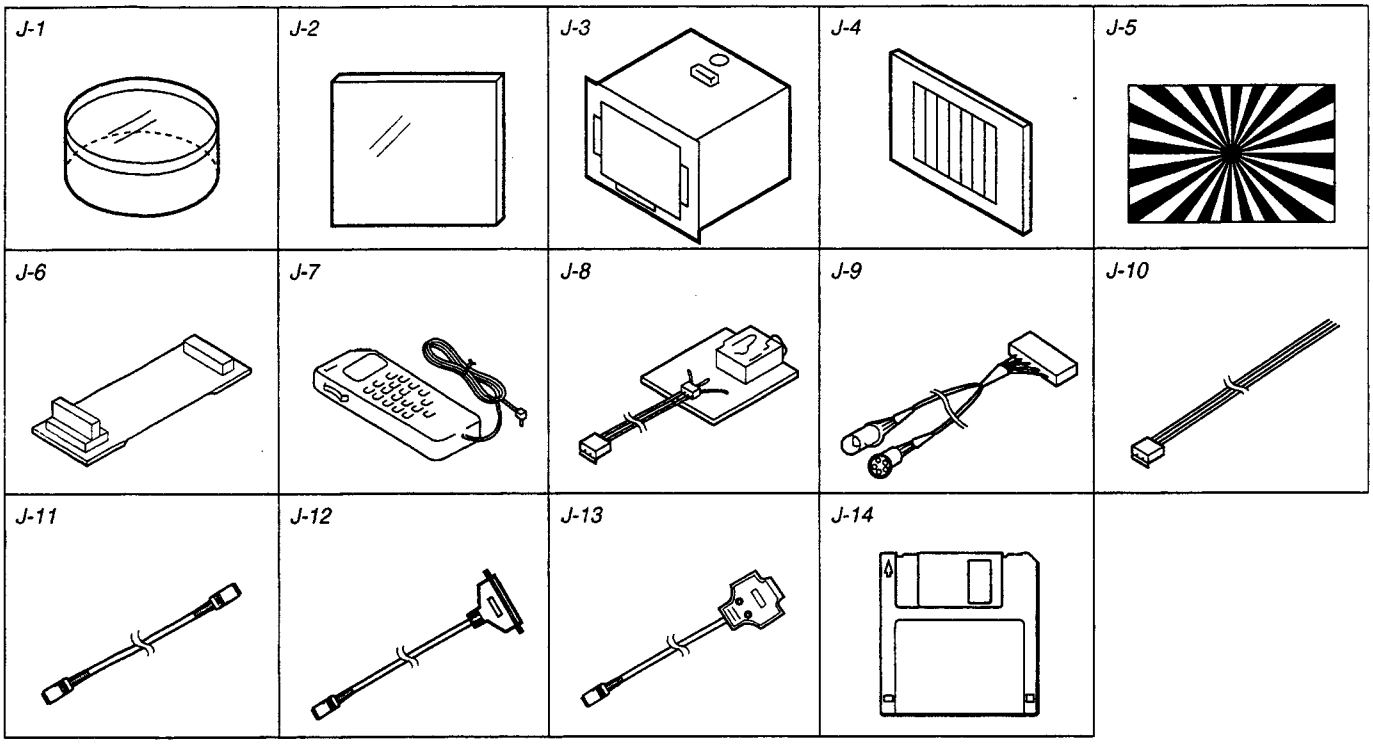


Fig. 7-1.

7-1-2. Preparations

Note: When adjusting only, it is not needed to remove the camera block from the pan tilt mechanism chassis.
The adjustments can be performed only by removing the camera cabinet.

1) Connect the equipments for adjusting as shown in Fig. 7-3.
2) Turning OFF the auto focus using the adjusting remote commander.
   1. Set data: 01 to page: 6, address: 25.
   (The auto focus will turn OFF. The focus can be adjusted using the focus button on the adjusting remote commander. But the HOLD switch must be set to OFF.)
   2. After completing the adjustment/operation check, set data: 00 to page: 6, address: 25.
3) To adjust the camera block only, there are two procedures.
   1. Adjust with the camera block mounted to the pan tilt mechanism chassis. (Fig. 7-2 (1), Fig. 7-3 (1))
   Note: AT-21/21P board must be removed before 28MHz original oscillation adjustment can be performed.
   2. Remove the camera block from the pan tilt mechanism chassis and perform adjustment to the camera block only.
   (Fig. 7-2 (2), Fig. 7-3 (2))
   Note: Be sure to change the data of page: D, address: 01 to 00 (NTSC) or 01 (PAL). Then, remove the camera block from the pan tilt mechanism chassis.
   After this adjustment, be sure to perform the operation described in 7-2-20 and 7-2-22.

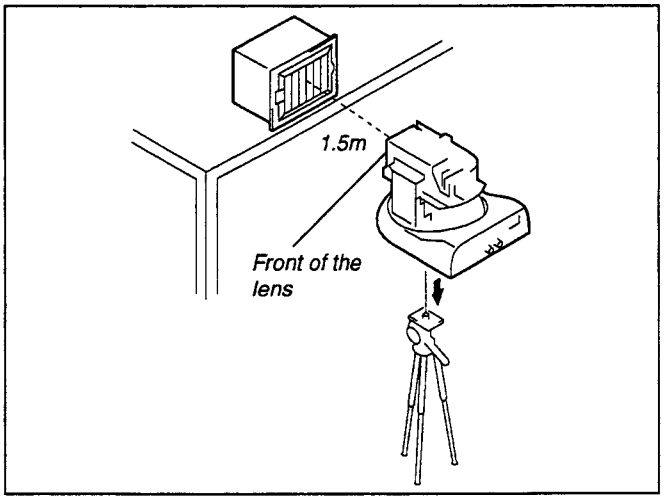


Fig. 7-2 (1).

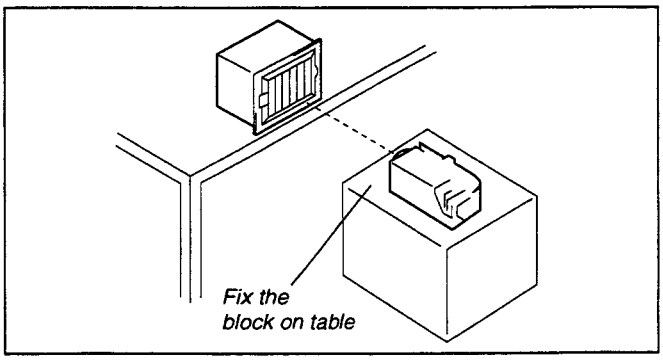


Fig. 7-2 (2).

Note: The camera block has no screw plate for tripod. So, fix the block on a table when adjusting.

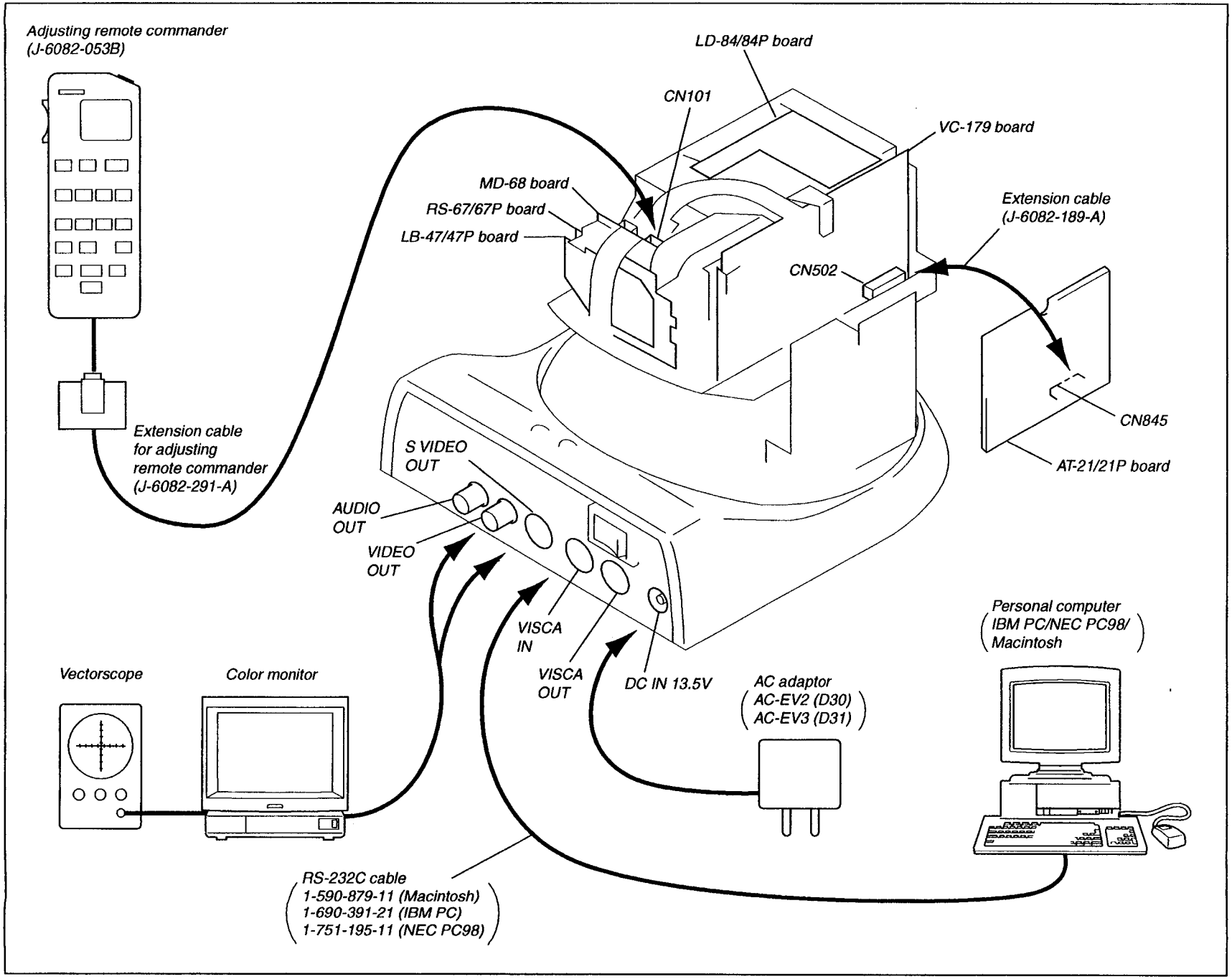

Adjusting remote commander
(J-6082-053B)
LD-84/84P board
CN101
VC-179 board
MD-68 board
RS-67/67P board
LB-47/47P board
Extension cable
(J-6082-189-A)
CN502
CN845
AT-21/21P board
Extension cable
for adjusting
remote commander
(J-6082-291-A)
S VIDEO
OUT
AUDIO
OUT
VIDEO
OUT
VISCA
IN
VISCA
OUT
DC IN 13.5V
Vectorscope
Color monitor
AC adaptor
(AC-EV2 (D30)
AC-EV3 (D31))
Personal computer
(IBM PC/NEC PC98/
Macintosh)
RS-232C cable
(1-590-879-11 (Macintosh)
1-690-391-21 (IBM PC)
1-751-195-11 (NEC PC98))

Fig. 7-3 (1).

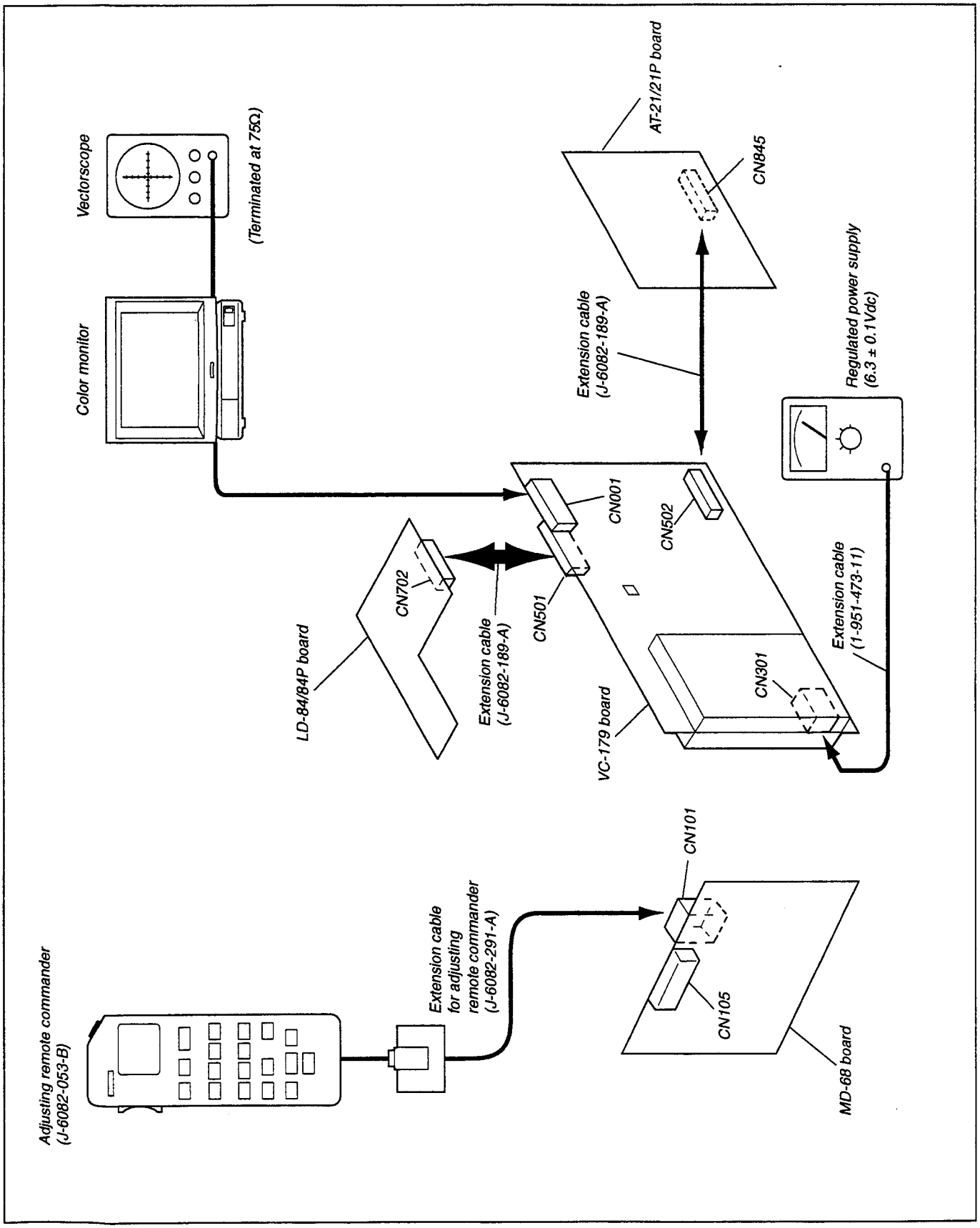

Vectorscope
(Terminated at 75Ω)
Color monitor
AT-21/21P board
CN845
Extension cable
(J-6082-189-A)
Regulated power supply
(6.3 ± 0.1Vdc)
CN001
CN502
CN702
CN501
LD-84/84P board
Extension cable
(J-6082-189-A)
Extension cable
(1-951-473-11)
CN301
VC-179 board
CN101
Adjusting remote commander
(J-6082-053-B)
Extension cable
for adjusting
remote commander
(J-6082-291-A)
CN105
MD-68 board

Fig. 7-3 (2).

7-1-3. Precautions

1. Switch settings

Adjust the switches to the following positions, and adjust unless specified otherwise.

1. Back up switch (RS-67/67P board S401) ..... Off
2. Camera number switch (SW-279/279P S323) 1
3. IR out switch (ID-11/11P board S101) ..... Off

2. Adjusting Procedure

Adjust in the given order.

3. Subject

1) Color bar chart (Standard picture frame)
   Adjust the picture frame as shown in Fig. 7-4. if adjustments are performed using the color bar chart. (Standard picture frame)
2) White pattern (Standard picture frame)
   Remove the color bar chart from the pattern box, and so that the white pattern will be displayed.
   Don't touch the zoom switch.

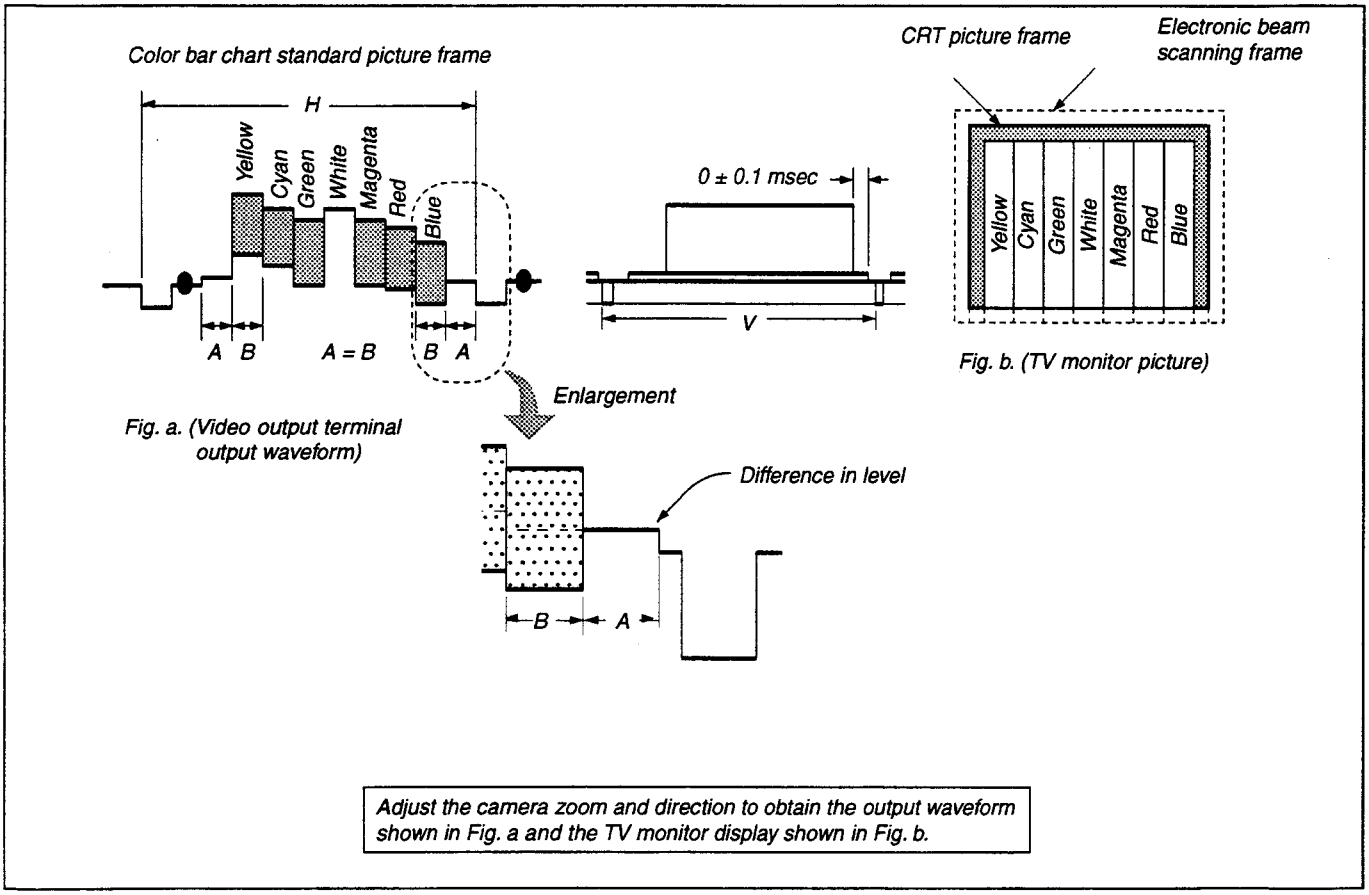


Fig. 7-4.

3) Chart for flange back adjustment
   Combine a white A0 size (1189 mm × 841 mm) paper to a black one, and make the chart shown in Fig. 7-5.

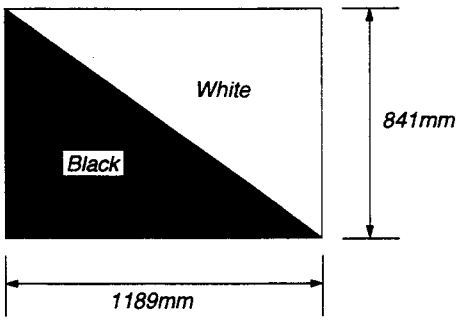


Fig. 7-5.

Note: Use the non-reflecting and non-glazing vellum paper whose size is more than A0, and make the boundary between white and black to be smoothly flat.

7-1-4. Adjusting Remote Commander

Use the adjusting remote commander to change the coefficient of the digital signal processing or the EVR data.
The adjusting remote commander uses the remote commander signal line (ECCP) to perform the bidirectional communication with the camera microprocessor. The effect data of the bidirectional communication must be written in the nonvolatile memory.

1. Using the adjusting remote commander

1) Connect the adjusting remote commander to the ECCP terminal (MD-68 board CN101).
2) Adjust the HOLD switch of the adjusting remote commander to "HOLD" (SERVICE position).

If it has been properly connected, the LCD on the adjusting remote commander will display as shown in Fig. 7-6.

3) Operate the adjusting remote commander as follows.
   • Changing the page
     The page increases when the EDIT SEARCH+ button is pressed, and decreases when the EDIT SEARCH– button is pressed. There are altogether 16 pages, from 0 to F.

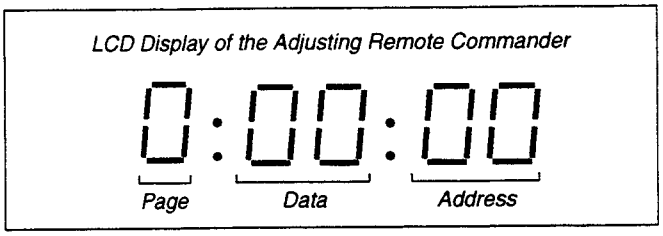
Hexadecimal notation	0 1 2 3 4 5 6 7 8 9 A B C D E F
LCD Display	0 1 2 3 4 5 6 7 8 9 A b c d E F
Decimal notation Conversion value	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Table. 7-1.

   • Changing the address
     The address increases when the FF (▶▶) button is pressed, and decreases when the REW (◀◀) button is pressed.
     There are altogether 256 addresses, from 00 to FF.
   • Changing the data (Data setting)
     The data increases when the PLAY (▶) button is pressed, and decreases when the STOP (■) button is pressed.
     There are altogether 256 data, from 00 to FF.
   • Writing the adjustment data
     The PAUSE button must be pressed to write the adjustment data (F page) in the nonvolatile memory.
     (The new adjustment data will not be recorded in the nonvolatile memory if this step is not performed.)
4) Select page: 6, address: 00, and adjust the data to 01.
   This releases the write protect of Page F, and enables the camera section (Addresses 01 to BF of page F)
   to be adjusted.
5) After completing all adjustments, turn off the main power supply once.

2. Precautions upon using the adjusting remote commander

Mishandling of the adjusting remote commander may erase the correct adjustment data at times. To prevent this, it is recommended that all adjustment data be noted down before beginning adjustments and new adjustment data after each adjustment.



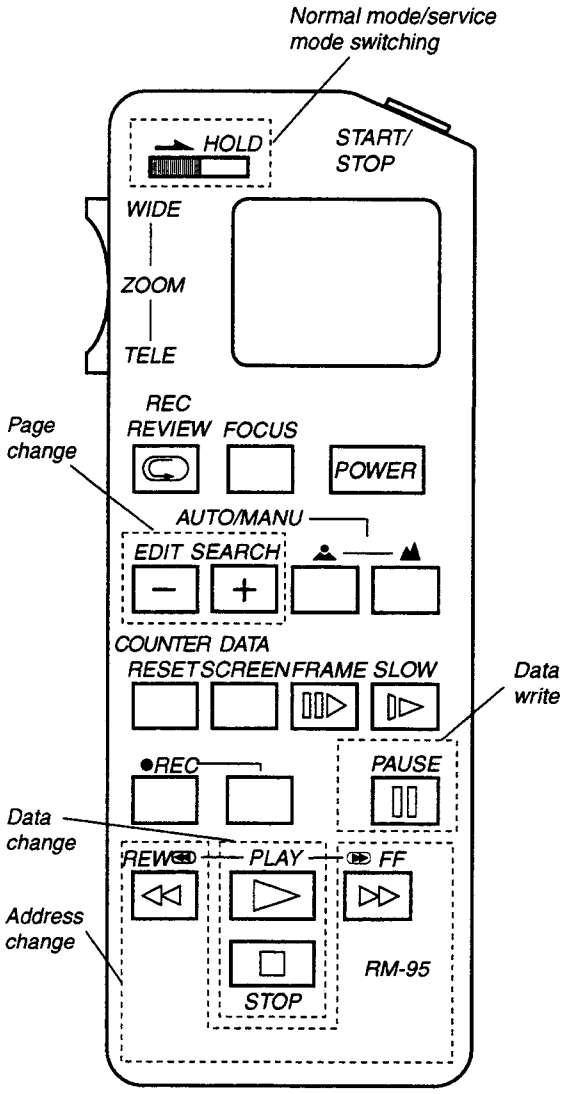


Fig. 7-6. Adjusting remote commander RM-95 (J-6082-053-B)

7-1-5. Page D Address List

Note 1: The adjustment data initial value is the data input before performing camera section adjustments (Page D) if the Page D data has been erased due to some reason.

Note 2: The data written in the adjustment data memo comumn are fixed.
After adjusting, check that these data have not been rewritten by mistake.

Note 3: In some case, data have been input to the page D address 71 to FF. This has no relation to the adjustment.

Note 4: No mark: EVI-D30 series
( ): EVI-D31 series

Note 5: * EVI-D30 (NTSC): 04 (Only Camera Block 00)
EVI-D31 (PAL): 05 (Only Camera Block 01)

Caution: When adjusting the camera with only the camera block mounted, use the data for Only Camera Block.
After the adjustment, assemble the camera block to the pan tilt mechanism chassis, then input the above data and complete the procedure.

Address	Adjustment data	
	Initial value	Memo column
00	00	
01	00 (01)	*
02	00	10
03	00	03
04	00	00
05	00	00
06	00	00
07	72	72
08	60	60
09	00	00
0A	00	00
0B	00	00
0C	00	00
0D	00	00
0E	00	00
0F	00	00
10	00	00
11	30	30
12	00	00
13	2C	2C
14	00	00
15	08	08
16	06	06
17	00	00
18	00	00
19	00	00
1A	00	00
1B	00	00
1C	00	00
1D	00	00
1E	00	00
1F	30	30
20	00	00
21	2C	2C
22	00	00
23	08	08
24	06	06
25	00	00
26	00	00
27	00	00
28	00	00
29	00	00
2A	00	00
2B	00	00

Table. 7-2 (1).

Address	Adjustment data	
	Initial value	Memo column
2C	00	00
2D	30	30
2E	00	00
2F	2C	2C
30	00	00
31	08	08
32	06	06
33	00	00
34	00	00
35	00	00
36	00	00
37	00	00
38	00	00
39	00	00
3A	00	00
3B	30	30
3C	00	00
3D	2C	2C
3E	00	00
3F	08	08
40	06	06
41	00	00
42	00	00
43	00	00
44	00	00
45	00	00
46	00	00
47	00	00
48	00	00
49	30	30
4A	00	00
4B	2C	2C
4C	00	00
4D	08	08
4E	06	06
4F	00	00
50	06	06
51	00	00
52	00	00
53	00	00
54	00	00
55	00	00
56	00	00
57	30	30
58	00	00
59	2C	2C
5A	00	00

Table. 7-2 (2).

Address	Adjustment data	
	Initial value	Memo column
5B	08	08
5C	06	06
5D	00	00
5E	00	00
5F	00	00
60	00	00
61	00	00
62	18	18 (1C)
63	14	14 (18)
64	02	02
65	0F	0F
66	00	00
67	00	00
68	03	03
69	01	01
6A	00	00
6B	00	00
6C	00	00
6D	00	00
6E	FE	FE
6F	FE	FE
70	FE	FE
71 to FF		

Table. 7-2 (3).

7-1-6. Page F Address List

Note 1: The data already listed in the adjustment data memo column are fixed values.

Note 2: The adjustment data initial values are values just after executing "Page F Data Initialization" and "Page F Data Modification". They are different from the values after executing all adjustments.

Note 3: In some cases, data have been input to the page F addresses C0 to EF. This has no relation to the adjustments.

Note 4: No mark : EVI-D30 series
( ) : EVI-D31 series

Address	Adjustment data	
	Initial value	Memo column
00	00	9C (9D)
01	00 (21)	00 (21)
02	00	00
03	40	40
04	80	
05	80	
06	80	
07	80	
08	2D	
09	26	
0A	FA	
0B	F1	
0C	30	
0D	00	
0E	58	
0F	00	
10	E0	E0
11	8F	
12	6C	
13	36	
14	3C	
15	60	
16	0D	
17	A3	
18	12	
19	8E	
1A	10	
1B	E2	
1C	0C	0C
1D	00	00
1E	80	
1F	80	
20	79	79
21	79	79
22	80	
23	77	77
24	5E (71)	77 (8A)
25	75	75
26	45	45
27	3F	3F
28	23	23
29	0B (0E)	0B (0E)

Table. 7-3 (1).

Address	Adjustment data	
	Initial value	Memo column
2A	28 (2C)	28 (2C)
2B	40	40
2C	FF	FF
2D	26 (42)	26 (42)
2E	16	16
2F	26	26
30	00	00
31	00	00
32	46 (4A)	46 (4A)
33	00	00
34	50	50
35	35	35
36	02	02
37	00	00
38	83	83
39	6A	6A
3A	50	50
3B	80	80
3C	20	20
3D	C0	C0
3E	00	
3F	00	
40	00	
41	00	
42	00	
43	00	
44	00	
45	00	
46	00	
47	00	
48	00	
49	00	
4A	00	
4B	00	
4C	00	
4D	00	
4E	00	
4F	20	20
50	02	02
51	02	02
52	66	66
53	18	18

Table. 7-3 (2).

Address	Adjustment data	
	Initial value	Memo column
54	6B	6B
55	9F	9F
56	66	66
57	6C	6C
58	5C	5C
59	83	83
5A	67	67
5B	5C	5C
5C	5C	5C
5D	4A	4A
5E	20	20
5F	5C	5C
60	3C	3C
61	33	33
62	0C	0C
63	26	26
64	24	24
65	A0	A0
66	04	04
67	05	05
68	00	00
69	00	00
6A	04 (00)	04 (00)
6B	00	00
6C	04 (00)	04 (00)
6D	00	00
6E	02	02
6F	33	33
70	B0	B0
71	18	18
72	0F	0F
73	0F	0F
74	00 (02)	00 (02)
75	43	47
76	1B	1B
77	E8 (D8)	E8 (D8)
78	A0	A0
79	30 (28)	30 (28)
7A	10 (0D)	10 (0D)
7B	50	50
7C	58	58
7D	88	88

Table. 7-3 (3).

Address	Adjustment data	
	Initial value	Memo column
7E	66	66
7F	46	46
80	8F	8F
81	00	00
82	20	20
83	18	18
84	02	02
85	08	08
86	40	40
87	20	20
88	40	40
89	30	30
8A	50	50
8B	60	60
8C	80	80
8D	23 (27)	23 (27)
8E	60 (6C)	60 (6C)
8F	00	00
90	00	00
91	77	77
92	00	00
93	FB	FB
94	04	04
95	32	32
96	6B	6B
97	8D	8D
98	A1	A1
99	30	30
9A	30	30
9B	21	21
9C	91	91
9D	72	72
9E	00	00
9F	00	00
A0	00	00
A1	00	00
A2	00	00
A3	00	00
A4	02	02
A5	80	80
A6	00	00
A7	80	80

Table. 7-3 (4).

Address	Adjustment data	
	Initial value	Memo column
A8	00	00
A9	80	80
AA	00	00
AB	80	80
AC	00	00
AD	00	00
AE	02	02
AF	44 (87)	44 (87)
B0	3D (39)	3D (39)
B1	25	25
B2	3D (39)	3D (39)
B3	25	25
B4	12 (32)	12 (32)
B5	4B (4A)	4B (4A)
B6	40	40
B7	68	68
B8	00	00
B9	80	80
BA	00	00
BB	00	00
BC	00	00
BD	00	00
BE	6B (6C)	6B (6C)
BF	2F (33)	2F (33)
C0 to EF		
F0		
F1		
F2		
F3		
F4		
F5		
F6		
F7		
F8		
F9		
FA		
FB		
FC		
FD		
FE		
FF		

Table. 7-3 (5).

7-1-7. Page 5 Address List

Note 1: The adjustment data initial value is the data input before performing camera section adjustments (Page 5) if the Page 5 data has been erased due to some reason.

Note 2: The data written in the adjustment data memo column are fixed.
After adjusting, check that these data have not been rewritten by mistake.

Note 3: In some case, data have been input to the page 5 address A0 to FF. This has no relation to the adjustment.

Note 4: No mark : EVI-D30 series
( ) : EVI-D31 series

Address	Adjustment data	
	Initial value	Memo column
00		
01	00 (01)	00 (01)
02	04 (03)	04 (03)
03	2A	2A
04	03	03
05	1B (1C)	1B (1C)
06	6C (7C)	6C (7C)
07	14 (18)	14 (18)
08	7C (8C)	7C (8C)
09	14 (18)	14 (18)
0A	20 (24)	20 (24)
0B	0C (0E)	0C (0E)
0C	00	00
0D	00	00
0E	0A	0A
0F	1D	1D
10	00	00
11	01	01
12	02	02
13	10	10
14	11	11
15	12	12
16	13	13
17	14	14
18	10	10
19	12 (10)	12 (10)
1A	10	10
1B	10 (0C)	10 (0C)
1C	16	16

Table. 7-4 (1).

Address	Adjustment data	
	Initial value	Memo column
1D	96	96
1E	A0	A0
1F	8C	8C
20	6E	6E
21	82	82
22	10	10
23	12 (10)	12 (10)
24	10	10
25	10 (0C)	10 (0C)
26	16	16
27	B4	B4
28	8C	8C
29	64	64
2A	82	82
2B	FF	FF
2C	01	01
2D	09	09
2E	04	04
2F	16	16
30	19	19
31	0F	0F
32	14	14
33	02	02
34	01	01
35	07	07
36	02	02
37		
38	3C	3C
39	78	78
3A	02	02
3B	3C	3C
3C	64	64
3D	00	00
3E	00	00
3F	00	00
40	02	02
41	00	00
42	0F	0F
43	10	10
44	18	18
45	00	00
46	03	03
47	02	02
48	7F	7F

Table. 7-4 (2).

Address	Adjustment data	
	Initial value	Memo column
49	FF	FF
4A	7F	7F
4B	FF	FF
4C	7F	7F
4D	FF	FF
4E	7F	7F
4F	FF	FF
50	03	
51	5E	
52	01	
53	1A	
54	06	
55	BC	
56	02	
57	34	
58	02	
59	03	
5A	0B	0B
5B	0B	0B
5C	44	44
5D	74	74
5E	48	40
5F	04	04
60	09	09
61	06	06
62	12	12
63	12	12
64	04	04
65	04	04
66	05	05
67	05	05
68	07 (08)	07 (08)
69	07 (08)	07 (08)
6A	0C (0A)	0C (0A)
6B	0C (0A)	0C (0A)
6C	00	00
6D	0E	0E
6E	00	00
6F	16	16
70	00	00
71	50	50
72	00	00
73	60	60
74	0C	0C

Table. 7-4 (3).

Address	Adjustment data	
	Initial value	Memo column
75	06	06
76	06	06
77	03	03
78	14 (17)	14 (17)
79	14	14
7A	05 (04)	05 (04)
7B	30	30
7C	30	30
7D	81	81
7E	18 (1C)	18 (1C)
7F	14 (18)	14 (18)
80	02	02
81	02	02
82	02	02
83	02	02
84	02	02
85	0A	0A
86	0F	0F
87	96	96
88	20	20
89		
8A		
8B		
8C	00	00
8D		
8E		
8F		
90	28	28
91	6C	6C
92	02	02
93	06	06
94	46	46
95	40	40
96	50	50
97	0B	0B
98	04	04
99	64	64
9A	30	30
9B	0A	0A
9C	06	06
9D	04	04
9E	0C	0C
9F	00	00
A0 to FF		

Table. 7-4 (4).

7-1-8. Data Processing

The calculation of the adjusting remote commander display data (hexadecimal notation) is required for obtaining the adjustment data of some adjustment itemes. In this case, after converting the hexadecimal notation to decimal notation, calculate and convert the result to hexadecimal notation, and use it as the adjustment data. Table 7-5. indicates the hexadecimal notation-the decimal notation calculation table.

Hexagecimal notation-Decimal notation

② μ

The lower digits of the hexadecimal notation / The upper digits of the hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A (*A*)	B (*b*)	C (*c*)	D (*d*)	E (*E*)	F (*F*)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A (*A*)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
①→ B (*b*)	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C (*c*)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D (*d*)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E (*E*)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F (*F*)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: ( ) indicate the adjusting remote commander display.

(Example) In the case that the adjusting remote commander display is BD (*bd*).
As the upper digit of the hexadecimal notation is B (*b*), and the lower digit is D (*d*), the intersection "189" of the ① and ② in the above table is the decimal notation to be calculated.

Table. 7-5.

7-2. CAMERA SYSTEM ADJUSTMENT

7-2-1. Power Supply Voltage Check (VC-179 board)

Subject	Option
Measuring instrument	Digital voltmeter
MT5V check	
Measurement point	Pins ⑥ and ⑧ of CN501
Specified value	4.9 ± 0.1 Vdc
D3.5V check	
Measurement point	Pin ⑬ and ⑭ of CN504
Specified value	3.55 ± 0.1 Vdc
CAM4.9V check	
Measurement point	Pin ⑰ and ⑱ of CN504
Specified value	4.9 ± 0.1 Vdc
CAM15V check	
Measurement point	Pin ① of CN401
Specified value	15.2 ± 0.3 Vdc
CAM – 8.5V check	
Measurement point	Pin ③ of CN401
Specified value	$-8.5^{+0.25}_{-0.4}$ Vdc

Checking method:

1) Check that each power supply voltage satisfies the specified value.

7-2-2. Page D Data Initialization

Initializing method:

1) Page: 1, address: 00, data: 01.
2) Check that the data of page: 1, address: 03 is 00.
3) • EVI-D30 (NTSC)
   Set data: 01 to page: 1, address: 02, and press the PAUSE button of the adjusting remote commander.
   • EVI-D31 (PAL)
   Set data: 02 to page: 1, address: 02, and press the PAUSE button of the adjusting remote commander.
4) Check that the data of page: 1, address: 03 is 01.
5) Set data: 00 to page: 1, address: 02, and press the PAUSE button of the adjusting remote commander.
6) After performing "Page D data modification", perform all the adjustments of the camera section (page D).

7-2-3. Page D Data Modification 1

The data (initial data) that is automatically written on page D after the initialization of the page D data will differ according to some camera micro processor versions. Change the data by manual input, arrange it.

Note 1: When changing the data, to write the data to the non-volatile memory, press the PAUSE button of the adjusting remote commander every time the new data is set.

EVI-D30

Address	Data
01	*
02	10
03	03

EVI-D31

Address	Data
01	*
02	10
03	03

Note 2: * EVI-D30: 00
EVI-D31: 01
After the camera adjustment, input the data given below.
EVI-D30: 04
EVI-D31: 05
(Refar to 7-2-20. Page D Data Modification 2.)

7-2-4. Page F Data Initialization

Note: It is necessary to perform all adjustments of the camera section from the beginning again if the data of page F has been initialized.

Initializing method:

1) Page: 6, address: 00, data: 01.
2) Check that the data of page: 6, address: 11 is 00.
3) • EVI-D30 (NTSC)
   Set data: 2D to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
   • EVI-D31 (PAL)
   Set data: 2F to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Check that the data of page: 6, address: 11 is 01.
5) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) After performing "Page F data modification", perform all the adjustments of the camera section (page F).

7-2-5. Page F Data Modification

The data (initial data) that is automatically written on page F after the initialization of the page F data will differ according to some camera micro processor versions. Change the data by manual input, and arrange it.

Note 1: When changing the data, to write the data to the non-volatile memory, press the PAUSE button of the adjusting remote commander every time the new data is set.

Note 2: When changing address: 00, set the data of page: 6, address: 00 to 80.

EVI-D30

Address	Data
24	77
70	47

EVI-D31

Address	Data
24	8A
70	47

[Distinguishing the Camera Micro Processor (VC-179 Board IC502) Versions]

Each version can be distinguished by looking at the part name of the camera micro processor or the data of page: 6, address: 10.

Version	Part Name	Page: 6 Address: 10
Ver. 2.0	SC424624	20

7-2-6. 28 MHz Original Oscillation Adjustment (VC-179 board)

Adjust the 28 MHz oscillation of the synchronization clock.
If the oscillation is not 28 MHz, the period will be inaccurate or the image will not be in color.

Subject	Not required
Measurement Point	CL401 (IC402 ⑫ pin)
Measuring Instrument	Frequency counter
Adjustment Page	F
Adjustment Address	22
Specified Value	14318181 ± 71Hz (NTSC)
	14187500 ± 70Hz (PAL)

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Change the data of page: F, address: 22 to adjust the oscillation frequency to 14318181 ± 71Hz (14187500 ± 70Hz).

7-2-7. V SUB Adjustment

Set the CCD imager V SUB voltage to the voltage specified for the imager.

Subject	Not required
Adjustment Page	F
Adjustment Address	04

Adjusting method:

1) Read the V SUB voltage code of the CCD imager.
   Obtain the corresponding V SUB data from the following table.
2) Set data: 01 to page: 6, address: 00.
3) Set the V SUB data to page: F, address: 04.
4) Press the PAUSE button of the adjusting remote commander.

V SUB			V SUB		
Voltage Code	Data	Voltage (Vdc)*1	Voltage Code	Data	Voltage (Vdc)*1
e	70	9.0	q	AC	14.0
f	77	9.5	r	B2	14.5
g	7C	10.0	s	B8	15.0
h	82	10.5	t	BE	15.5
j	88	11.0	u	C4	16.0
k	8E	11.5	v	CA	16.5
l	94	12.0	w	D0	17.0
m	9A	12.5	x	D6	17.5
n	A0	13.0	y	DD	18.0
p	A6	13.5	z	E2	18.5

7-2-8. VRG Adjustment

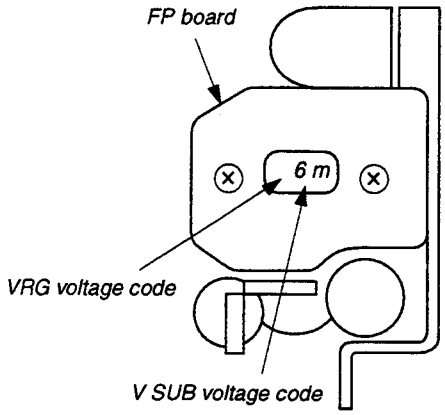
Set the CCD imager V RG voltage to the voltage specified for the imager.

Subject	Not required
Adjustment Page	F
Adjustment Address	05

Adjusting method:

1) Read the VRG voltage code of the CCD imager.
   Obtain the corresponding VRG data from the following table.
2) Set data: 01 to page: 6, address: 00.
3) Set the VRG data to page: F, address: 05.
4) Press the PAUSE button of the adjusting remote commander.

VRG		
Voltage Code	Data	Voltage (Vdc)*2
1	34	1.0
2	4E	1.5
3	69	2.0
4	83	2.5
5	9E	3.0
6	B8	3.5
7	D3	4.0



(Example) When "6m" is displayed:
The V SUB voltage code is "m" and therefore the V SUB data will be "9B".
The VRG voltage code is "6" and therefore the VRG data will be "B8".

Fig. 7-7.

7-2-9. Flange Back Adjustment

The flange back adjustment for the inner focus lens is performed automatically.

Subject	Chart for flange back adjustment (2000 ± 5mm from the front side of the lens Luminance: 300 ± 50 lux)
Measurement Point	Check the operation on the TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	16, 17, 18, 19, 1A, 1B

Adjusting method:

1) Check that the flange back adjustment chart center and the exposure display center coincide at both zoom lens TELE end and WIDE end.
2) Set data: 01 to page: 6, address: 00.
3) Check that the data of page: 6, address: 21 is 00.
4) Check that the page: F, address: 16 to 1B data is at the initial value. (Refer to Table 7-3. "Page F address list")
5) Set data: 13 to page: 6, address: 01 and press the PAUSE button of the adjusting remote commander.
6) Set data: 15 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
   (The adjustment data is automatically input to page: F, addresses: 16 to 1B.)
7) Check that the data of page: 6, address: 21 is 01.
   (Display indicating flange back adjustment completion)

Processing after completing adjustments

1) Turn off the main power supply.

7-2-10. Flange Back Check

Subject	Siemens star (2m from the front of the lens)
Measurement Point	TV monitor
Measuring Instrument	
Specified Value	Focused at the TELE end and WIDE end.

Checking method:

1) Place the Siemens star 2m from the front of the lens.
2) To open the IRIS, decrease the luminous intensity to the Siemens star up to a point before noise appears on the image.
3) Shoot the siemens star with the zoom TELE end.
4) Turn ON the auto focus.
5) When the lens is focused, turn OFF the auto focus.
6) Shoot the siemens star with the zoom WIDE end.
7) Check that the lens is focused.

Note 1: When the auto focus is ON, the lens can be checked if it is focused or not by observing the data on page A of the adjusting remote commander.

1) Set data: 0C to page: 6, address: 02.
2) Page A shows the state of the focus.
   A: 00: XX
   (Odd: Focused
   Even: Unfocused)

Processing after compleating adjustments

1) Set data: 00 to page: 6, address: 02.

7-2-11. HALL Adjustment

To eliminate the differences in the outputs of the hall element attached to the iris for detecting the position of the lens iris, adjust the hall AMP gain and hall offset.

Subject	Not required
Measurement Point	Lower 2 digits of the date of the page
Measuring Instrument	A displayed
Adjustment Page	F
Adjustment Address	06, 07
Specified Value	33 to 37 during IRIS OPEN B4 to B8 during IRIS CLOSE

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 03 to page: 6, address: 02.
3) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Set data: 80 to page: F, address: 07, and press the PAUSE button of the adjusting remote commander.
5) Set data: 40 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
6) Read the page A display data, and this data is named W2.
7) Set data: 30 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
8) Read the page A display data, and this data is named W1.
9) Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
10) Read the page A display data, and this data is named K1.
11) Set data: 40 to page: F, address: 06, and press the PAUSE button.
12) Read the page A display data, and this data is named K2.
13) Convert W1, W2, K1, K2 to decimal notation, and obtain W1', W2', K1', K2'. (Refer to Table 7-5. "Hexadecimal notation-decimal notation conversion table".)
14) Calculate X1' using the following equations (decimal notation calculation).

$A' = W2' + K1' - W1' - K2'$ ..... Equation 1

$B' = W1' - K1'$ ..... Equation 2

$$X1' = \frac{2080 + (48 \times A') - (16 \times B')}{A'}$$ ..... Equation 3

15) Convert X1' to hexadecimal notation, and obtain X1. (Round off to one decimal place)
16) Set data: X1 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
17) Change the data of page: F, address: 07, and adjust the page A display data to "35".
18) Press the PAUSE button of the adjusting remote commander.
19) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
20) Read the page A display data, and this data is named W0. If W0 lies within the "B4" to "B8" range, perform "Processing after completing adjustments". If it lies outside the range, perform the following adjustments.
21) Convert W0 to hexadecimal notation, and obtain W0'.
22) Calculate X2' using the following equations (decimal notation calculation).

$C' = W0' - B' - 52$ ..... Equation 4

$$X2' = \frac{(130 - B') \times (X1' - 48) + 48 \times C}{C'}$$ ..... Equation 5

(X1' and B' are values obtained from equations 2 and 3)

23) Convert X2' to hexadecimal notation and obtain X2. (Round off to one decimal place)
24) Set data X2 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
25) Change the data of page: F, address: 07, and adjust tha page A display data to "B6".
26) Press the PAUSE button of the adjusting remote commander.
27) Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
28) Check that the page A display data lies within the "33" to "37" range.

Processing after Completing Adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.

7-2-12. Picture Frame Setting

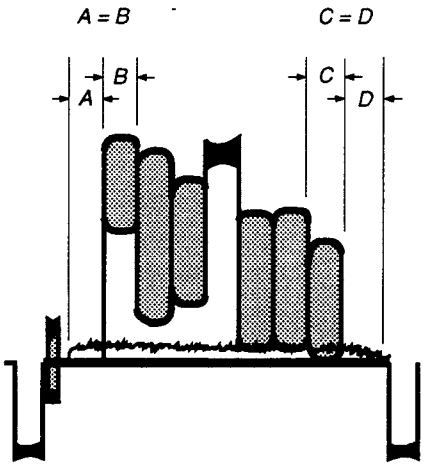
Subject	Color bar chart standard picture frame
Measurement Point	VIDEO OUTPUT terminal
Measuring Instrument	Oscilloscope and TV monitor
Specified Value	A=B, C=D, t=0 ± 0.1 msec

Setting method:

1) Turn the auto focus off.
2) Adjust the focus.
3) Adjust the zoom and the camera direction, and set to the specified position.
4) Mark the position of the picture frame on the monitor display, and adjust the picture frame to this position in following adjustments using "color bar chart standard picture frame".

Check on the oscilloscope

1. Horizontal period



2. Vertical period

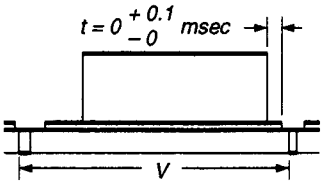


Fig. 7-8.

Check on the TV monitor

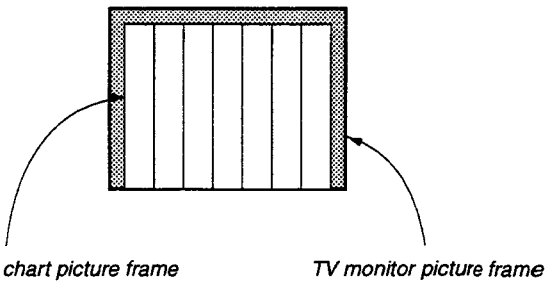


Fig. 7-9.

7-2-13. Color Reproduction Adjustment

Adjust the color separation matrix coefficient so that the proper color reproduction is produced.

Subject	Color bar chart standard picture frame
Measurement Point	VIDEO OUTPUT terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	08, 09, 0A, 0B
Specified Value	All color luminance points should settle within each color reproduction frame.

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 00 to page: 6, address: 03.
3) Set data: F1 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
4) Adjust the GAIN and PHASE of the vectorscope, and adjust the burst luminance point to the burst position of the color reproduction frame.
5) Change the data of addresses 08, 09, 0A and 0B of page: F, and settle each color luminance point in each color reproduction frame.

Note 1: Be sure to press the PAUSE button of the adjusting remote commander before changing the addresses.
If not, the new data will not be written to the memory.

6) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set data: E0 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
2) Set data: 26 to page: F, address: 63, and press the PAUSE button of the adjusting remote commander.
3) Set data: 10 to page: 6, address: 03.

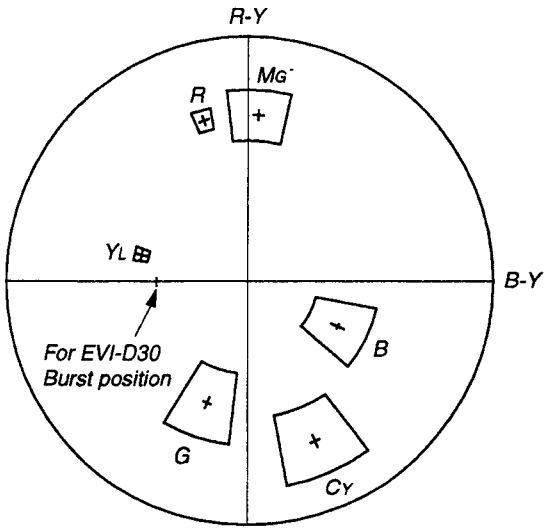


Fig. 7-10.

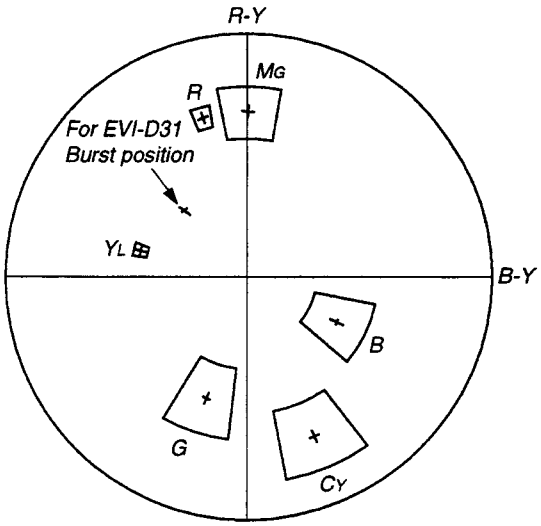


Fig. 7-11.

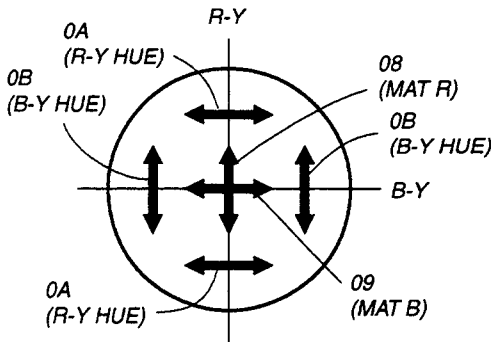


Fig. 7-12. Direction of the Movements of the Adjustment Address and Luminance Point.

7-2-14. IRIS IN/OUT Adjustment (VC-179 board)

For the unit to judge if the white balance is indoors or outdoors in auto white balance operations, measure the light level and write it in the EEPROM.
If the level is not correct, the white balance will not be accurate.

Subject	White pattern
Measurement Point	Lower 2 digits of the date of the page
Measuring Instrument	A displayed
Adjustment Page	F
Adjustment Address	13, 14

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 0E to page: 6, address: 02.
3) Set data: 0B to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Read the page A display data (Note 1), and take the upper two digits as D1 and the lower two as D2.
5) Convert D1 to a decimal number and obtain D1'. (Refer to Table 7-5. "Hexadecimal Notation-Decimal Notation Conversion Table".)
6) Calculate D3' using the following equations. (Equations 1 and 2 are for decimal notation calculation)
   When D2 ≧ D0
   D3' = D1' – 21 ..... Equation 1
   When D2 < D0
   D3' = D1' – 22 ..... Equation 2
7) Convert D3' to a hexadecimal number and obtain D3.
8) Set D3 to page: F, address: 13, and press the PAUSE button of the adjusting remote commander.
9) Set data: 09 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
   (IND0.5 SHUTTER mode setting)
10) Read the page A display data (Note 1), and take the upper two digits as D4 and the lower two as D5.
11) Convert D4 to decimal number and obtain D4'. (Refer to Table 7-5. "Hexadecimal Notation-Decimal Notation Conversion Table".)
12) Calculate D6' using the following equations. (Equations 3 and 4 are for decimal notation calculation)
   When D5 ≧ F0
   D6' = D4' – 13 ..... Equation 3
   When D5 < F0
   D6' = D4' – 14 ..... Equation 4
13) Convert D6' to a hexadecimal number and obtain D6.
14) Set D6 to page: F, address: 14, and press the PAUSE button of the adjusting remote commander.

Note 1: The right four digits of the display data at the right bottom side of the monitor TV is the LIGHT LEVEL data.
If the lower digits change severely and cannot be read, record it on a tape once, play it back by frame feeding, and obtain the average value.

Processing after Completing Adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 6, address: 02.

7-2-15. MAX GAIN Adjustment (VC-179 board)

Correct the differences in the minimum illuminance.
If the illuminance is not consistent, the image level required for taking subjects in low illuminance will not be produced (dark).

Subject	White pattern standard picture frame
Measurement Point	VIDEO OUT terminal
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	15
Specified Value	EVI-D30 A=450mV EVI-D31 A=460mV

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 04 to page: F, address: 2D.
3) Set data: 19 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Change the data of page: F, address: 15, and adjust so that the signal level (A) becomes the specified value.
   Note: Tha data of address: 15 should be 70 to FF.
5) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
2) Return the data page: F, address: 2D to an initialized value.

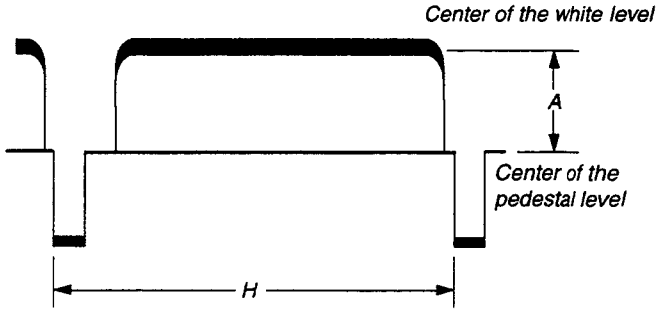


Fig. 7-13.

7-2-16. Auto White Balance Standard Data Input

Subject	White pattern standard picture frame
Adjustment Page	F
Adjustment Address	0C, 0D, 0E, 0F

Adjusting method:

1) Turn the power of the unit OFF/ON.
2) Set data: 01 to page: 6, address: 00.
3) Check that the data of page: 6, address: 11 is 00.
4) Wait for 2 seconds.
5) Set data: 11 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) Set data: 0D to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
   (When the standard data is taken in, the data will be automatically input to addresses 0C to 0F of page F.)
7) Check that the data of page: 6, address: 11 is 01.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.

7-2-17. Auto White Balance Adjustment

Adjust to the proper auto white balance output data.
If it is not correct, auto white balance and color reproducibility will be poor.

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction
Measurement Point	Check with the 2 digits of page A displayed
Measuring Instrument	
Adjustment Page	F
Adjustment Address	11, 12
Specified Value	R ratio: 2B40 to 2BC0 B ratio: 5E00 to 5F00

Adjusting method:

1) Place the C14 filter for color temperature correction on the lens.
2) Set data: 01 to page: 6, address: 00.
3) Set data: D0 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
4) Set data: 04 to page: 6, address: 02.
5) Change the data of page: F, address: 11, and adjust the average value of the page A display data to the R ratio specified value.
6) Press the PAUSE button of the adjusting remote commander.
7) Set data: 05 to page: 6, address: 02.
8) Change the data of page: F, address: 12, and adjust the average value of the page A display data to the B ratio specified value.
9) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set data: E0 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 6, address: 02.

7-2-18. White Balance Check

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction ND filter 1.0 and 0.3
Measurement Point	VIDEO OUTPUT terminal
Measuring Instrument	Vectorscope
Specified Value	7-14 A to C

Checking method:

1) Check that the lens is not covered with either filter.
2) Set data: 01 to page: 6, address: 00.
3) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Check that the center of the white luminance point is within the circle shown in Fig. 7-14. A.
5) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) Set data: 23 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
7) Place the C14 filter on the lens.
8) Check that the center of the white luminance point settles in the circle shown in Fig. 7-14. B.
9) Remove the C14 filter, and place the ND filter 1.3 (1.0 + 0.3) on the lens.
10) Check that the center of the white luminance point settles in the circle shown in Fig. 7-14. C.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 6, address: 00, and press the PAUSE button.

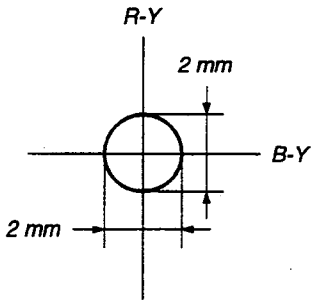


Fig. 7-14. A

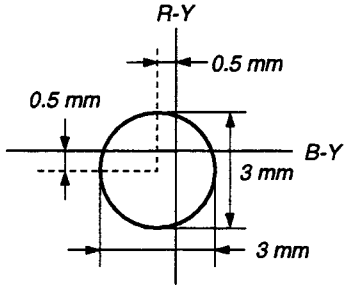


Fig. 7-14. B

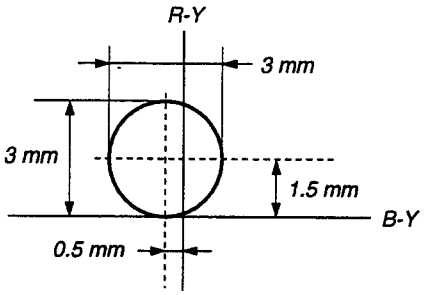


Fig. 7-14. C

7-2-19. VIDEO OUT Level Check

Subject	Color bar chart standard picture frame
Measurement Point	VIDEO OUTPUT terminal (Terminated at 75Ω)
Measuring Instrument	Oscilloscope
Specified Value	Y level = 650 ± 60mV (NTSC) = 630 ± 60mV (PAL) SYNC level = 286 ± 40mV (NTSC) = 300 ± 40mV (NTSC) BURST level = 286 ± 40mV (NTSC) = 300 ± 40mV (PAL)

Checking method:

1) Check that the Y level, SYNC level and BURST level satisfy the specified values.

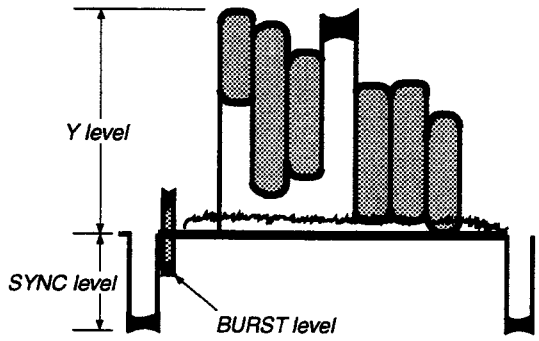


Fig. 7-15.

7-2-20. Page D Data Modification 2

After the camera adjustment, change the data of page D and address 01 to the following:

EVI-D30 (NTSC) Data: 04
EVI-D31 (PAL) Data: 05

7-2-21. Page 5 Data Initialization

Initializing method:

1) Page: B, address: 00, data: 01.
2) Check that the data of page: B, address: 02 is 00.
3) • EVI-D30 (NTSC)
   Set data: 80 to page: B, address: 01 and press the PAUSE button of the adjusting remote commander.
   • EVI-D31 (PAL)
   Set data: 81 to page: B, address: 01 and press the PAUSE button of the adjusting remote commander.
4) Check that the data of page: B, address: 02 is 01.
5) Turn off the main power supply once.

7-2-22. Home Position Adjustment

Home position adjustment for Pan-Tilter is performed automatically.

Adjustment Page	5
Adjustment Address	50, 51, 52, 53, 54, 55, 56, 57, 58, 59

Adjusting method:

1) Set data: 01 to page: B, address: 00.
2) Check that the data of page: B, address: 02 is 00.
3) Set data: 10 to page: B, address: 01 and press the PAUSE button of the adjusting remote commander.
4) Check that the data of page: B, address: 02 is 01.
5) Set data: 40 to page: 5, address: 5E and press the PAUSE button of the adjusting remote commander.
6) Turn off the main power supply once.

Note: When the camera block has been removed from the pan tilt mechanism chassis, be sure to perform Home Position Adjustment.

7-3. ELECTRICAL BLOCK CHECK

7-3-1. MIC IN/AUDIO OUT Check

Measurement Point	AUDIO OUT terminal
Measuring Instrument	Audio generator, Audio level meter
Signal	1kHz, Sine wave, – 66dBs
Specified value	– 10 ± 4dBs

Checking method:

1) Input a sine wave of – 66dBs and 1kHz to the MIC IN on the rear of the set.
2) Connect level meter to AUDIO OUT on the rear of the set and measure the level.
3) The output level should satisfy the specified value.

7-3-2. Pan Tilter Operation Check

Checking method:

1) Use the infrared remote commander or VISCA to send the commands to move the pan tilter horizontally and vertically.
2) Drive the pan tilter to the top and bottom end points and to left and right end points.
3) Check that the tilter operates normally.

7-3-3. DATE and TIME Switch Check

Checking method:

1) Simultaneously press and hold down DATE switch and TIME switch for two seconds to enter the date and time setting mode.
2) Use DATE switch to send "Year" data, then use TIME switch to determine the year.
3) Repeat step 2) and set "Month", "Days", "Hours" and "Minutes".
4) Check that the date and time can be set normally.

7-3-4. Camera No. switch Check

Checking method:

1) Set CAMERA No. switch on the rear of the set to "1". Press CAMERA No. "1" on the infrared remote commander and press "P-T RESET" button.
2) Perform step (1) for CAMERA No. "2" on the set and on the infrared remote commander.
3) Check that SIRCS LED (ORG) indicator is lit on the front of the set and the pan tilt reset operation is executed.

SECTION 8
VISCA COMMAND LIST

8-1. VISCA Summary

EVI-D30/D31 uses a protocol called VISCA. In VISCA, the computer or other device issuing the commands is called the controller and the EVI-D30/D31 or other device receiving those commands is called the peripheral device. Under VISCA, up to 7 EVI-D30/D31 can be connected to one controller using RS-232C communications. The RS-232C parameters are communications speed of 9600 baud, data length of 8 bits, 1 stop bit, 1 start bit, and no parity. Flow control, such as XON/XOFF and RTS/CTS, is not used. The EVI-D30/D31 are connected in a daisy chain. The actual internal connections form a one-way ring, as shown in the figure below, so messages pass through all the EVI-D30/D31 and return to the controller. Each device has an address on this network. The address of the controller is always 0. The addresses of the EVI-D30/D31 are numbered 1, 2, 3, etc., in order from closer to the controller to farther away. As part of the initialization operations, the controller sends the address command to set the addresses for the EVI-D30/D31.

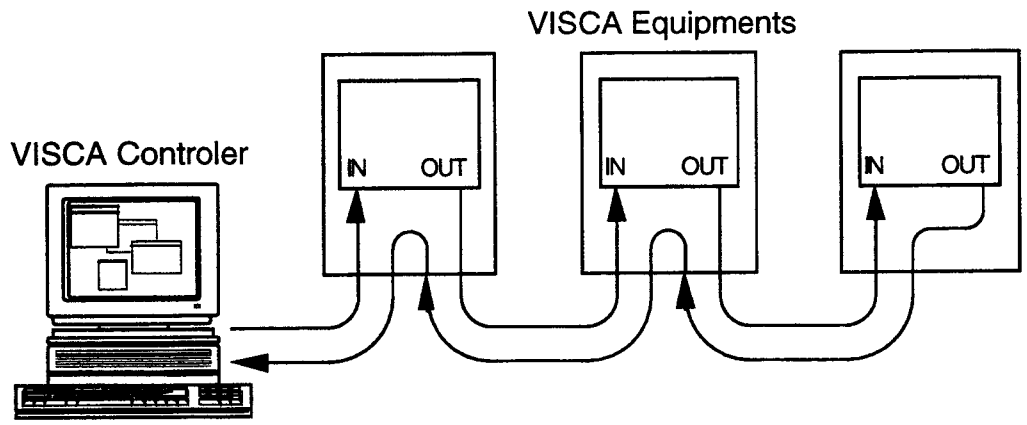
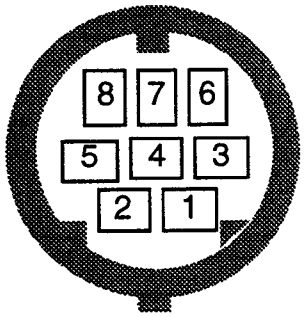


Fig. 8-1. VISCA Network

EVI-D30/D31 has a VISCA IN port and a VISCA OUT port. As viewed from the outside, both the VISCA IN and VISCA OUT ports have the connector pin layout shown in Fig. 8-2. During control by a computer, set the EVI-D30/D31 DTR input (the computer's S output) high.



1. DTR	Data Transmission Ready (OUTPUT)
2. $\overline{\text{DSR}}$	Data Set Ready (INPUT)
3. TXD	Transmit Data (OUTPUT)
4. GND	Ground
5. $\overline{\text{RXD}}$	Receive Data (INPUT)
6. GND	Ground
7. OPEN	Not Used
8. OPEN	Not Used

Fig. 8-2. VISCA Connector

8-2. EVI-D30/D31-VISCA Connection

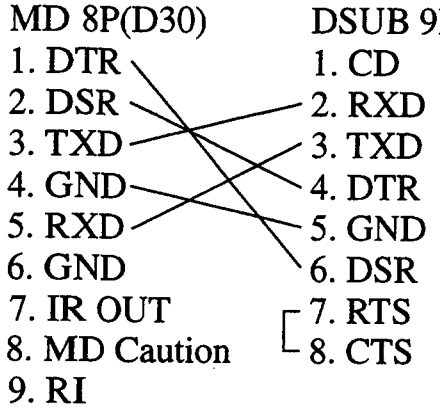


Fig. 8-3. VISCA Connection (Windows)

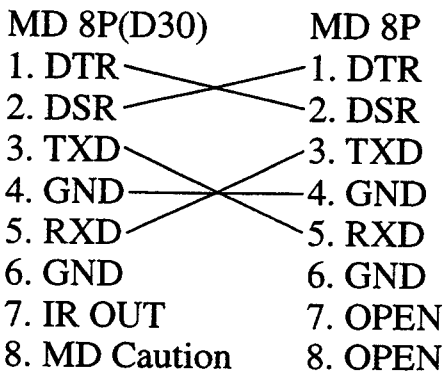


Fig. 8-4. VISCA Connection (Mac)

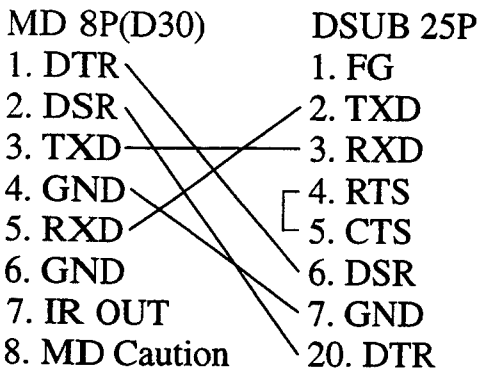


Fig. 8-5. VISCA Connection (PC98)

IR out

7pin is IR out port. Other remote comanders (carrier fruquency is 38KHz) is available.
out put level IR OUT switch (bottum of the camera S101) ON : 0 to 5Vdc
OFF : 0Vdc
When daisy chain, switch on only one camera. Its IR out is avilable.

MD caution

8pin is MD caution
out put level MD undetect : 0Vdc
MD detecting : 5Vdc

8-3. VISCA Communication Formats

8-3-1. VISCA Packet Structure

The basic unit for VISCA communications is the packet (shown in Fig. 8-6.). The first byte 1 in the packet is the header. It contains the sender and destination addresses. For example, the header for a packet sent from the computer at address 0 to EVI-D30/D31 at Address 1 is 81H (hexadecimal).
A packet sent to EVI-D30/D31 at Address 2 has a header of 82H. In the tables after pages, the header is listed as 8X. Insert the EVI-D30/D31 address in place of the X. The header for a packet sent in response from the EVI-D30/D31 at Address 1 is 90H. For a response packet form the EVI-D30/D31 at Address 2, the header is A0H.
Some of the EVI-D30/D31 setting commands can be sent to all the equipment at one time (broadcast). For a broadcast, the header is 88H.
The terminator, FFH, ends the packet.

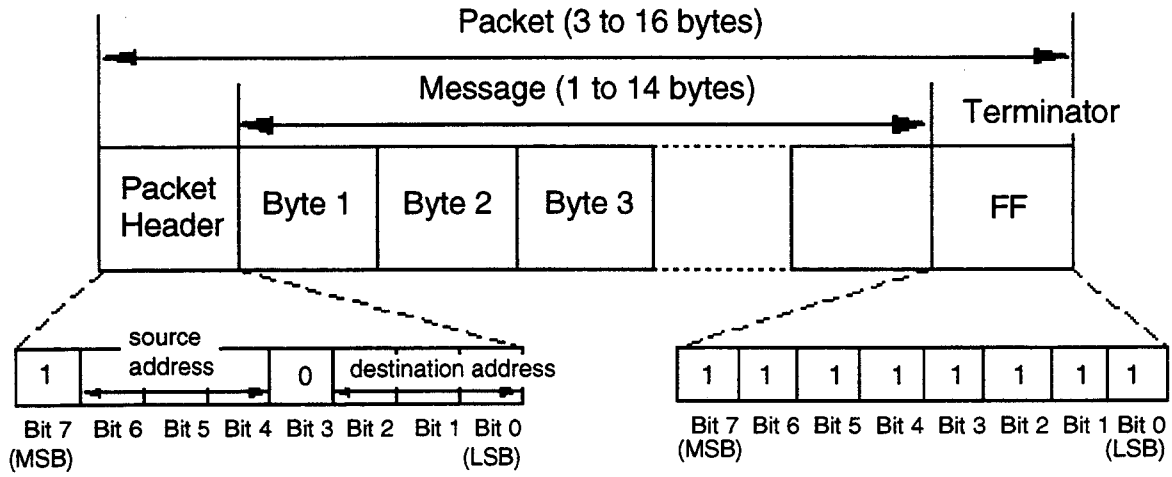


Fig. 8-6. VISCA Message Packet

8-3-2. Commands and Inquiries

Commands: Instruct the EVI-D30/D31 to carry out operations.
Inquiries: Instruct the EVI-D30/D31 to Inquire about the condition.

	Command Packet	Note
Command	8X 01 RR ... FF	RR = category code*
Inquiry	8X 09 RR ... FF	RR = category code*

*category code = 00 (Interface) , 04 (camera), 06 (pan/tilter)
*X = 1 to 7 : Address of EVI-D30/D31.

8-3-3. Responses to Commands and Inquiries

ACK message: Returned by EVI-D30/D31 when it has received a command.
Completion message: Returned by EVI-D30/D31 when it has completed execution of a command or inquiry. Please notice that it is returned when the micon of the camera starts to carry out the operation. For example Pan/Tilt, Zoom Tele/Wide or Focus Far/Near, it is returned before it has completed execution. Inspection for an inquiry instruction, the response data is from the 3rd byte on of the message packet.

	Reply Packet	Note
Ack	X0 4Y FF	Y = socket number
Completion (commands)	X0 5Y FF	Y = socket number
Completion (Inquiries)	X0 5Y ... FF	Y = socket number

X = 9 to F : EVI-D30/D31 address + 8

Error message: The EVI-D30/D31 returnes an error message instead of a Completeion message when it cannot execute a command or inquiry instruction, or execution fails.

Error Packet	Description
X0 6Y 01 FF	Message length error (>14bytes)
X0 6Y 02 FF	Syntax Error
X0 6Y 03 FF	Command buffer full
X0 6Y 04 FF	Command cancelled
X0 6Y 05 FF	No socket (to be cancelled)
X0 6Y 41 FF	Time out
X0 6Y 43 FF	Condition Error

X = 1 to 7 : EVI-D30/D31 address, Y = socket number

8-3-4. Socket Number

When a command message is sent to a EVI-D30/D31, the controller usually waits for the completion message or error message from that EVI-D30/D31 before sending the next message. However, in order to provide higher level usage, the EVI-D30/D31 has two command buffers (memories) so it can receive up to two commands (including the one it is executing) at a time. When the EVI-D30/D31 receives a command, it sets the socket number in the ACK message to tell the controller which command buffer is used.
Since this socket number is also included in the completion message or error message, the controller can see which command was completed. Even when the EVI-D30/D31 is using both commands and inquiries, no ACK message is returned, but rather a completion message with Socket Number 0 is returned.

8-3-5. Command Execution Stop

To cancel a command that you have already sent, send the IF_Clear cammand. To cancel just one cammand when you have already sent two, use a cancel.

	Cancel Packet	Note
Cancel	8X 2Y FF	Y = sockt number

X = 1 to 7 : EVI-D30/D31 address, Y = socket number

8-4. EVI-D30/D31 Setting Commands (Network setting)

Before starting EVI-D30/D31 control, always broadcast the Address command and the IF_Clear command.

8-4-1. VISCA Network Management Commands

Address: Set the address for EVI-D30/D31. This command is used when the network is initialized and when the network change message below is received.

Network Change: This command is sent from EVI-D30/D31 to the controller when a device is removed from or added to the network. When this message is received, the controller needs to reset the address.

	Packet	Notes
Address	88 30 01 FF	Always broadcasted.
Network Change	X0 38 FF	

X = 9 to F : EVI-D30/D31 address + 8

8-4-2. VISCA Interface Commands

IF_Clear: Clears the command buffers in the EVI-D30/D31 and stops the instruction being executed.

	Command Packet	Reply Packet
IF_Clear	8X 01 00 01 FF	X0 50 FF
IF_Clear (broadcast)	88 01 00 01 FF	88 01 00 01 FF

X = 1 to 7 : EVI-D30/D31 address (Inquiry packet)
= 9 to F : EVI-D30/D31 address + 8 (reply packet)

8-5. EVI-D30/D31 Functions

CAM_WB

1) Auto white balance (AWB)
For this unit's AWB, the TTL method is adopted to reproduce the colors of the subject as closely as possible by calculating the color data of the whole screen.
Furthermore, the white balance area is limited to prevent operations that show all objects as white from being performed when white balance operations are performed.
The area for performing the auto white balance is also changed by determining whether it is indoors or outdoors according to the brightness.

2) Preset white balance
The preset white balance can be selected from fixed indoors (3200K) and fixed outdoors (5800K).

3) One push white balance
The one push white balance is a function which, when once the subject is set to certain lighting conditions, will expose the subject under these conditions by gaining white forcibly.
The color is reproduced naturally without being affected by the surrounding conditions of the subject.
When set, the one-push white balance trigger is sent assuming that the white subject occupies more than 1/2 of the screen.
The one-push white balance data is provided when the lithium backup SW is ON even though the power is off (2 hours for fully-charged battery).When the lithium backup SW is off, the data will be lost when the power is turned off. Therefore, when turning off the power, set the one-push white balance again.

CAM_AE

1) Full auto
When the automatic exposure (AE) mode is set, the auto-iris, AGC (auto-gain), 1/60 sec shutter (EVI-D31 is 1/50 sec shutter) will operate.
When the power supply is turned on with the lithium backup off, the automatic exposure mode will be set.

2) Manual
When the manual mode is set, iris, gain and shutter will be set separately.

3) Bright Control
Bright Control is an adjustment function of the brightness with the combination of gain and iris. When in darkness, gain controls exposure and when in the brightness, iris controls exposure. Since both gain and iris are fixed, this function is useful when capturing images under fixed brightness condition. The status at auto exposure will be held once when changing the mode from auto exposure to Bright Control.

STEP	GAIN	IRIS	STEP	GAIN	IRIS	STEP	GAIN	IRIS
1	18dB	F1.8	9	0dB	F2.4	17	0dB	F9.6
2	15dB	F1.8	10	0dB	F2.8	18	0dB	F11
3	12dB	F1.8	11	0dB	F3.4	19	0dB	F14
4	9dB	F1.8	12	0dB	F4	20	0dB	F16
5	6dB	F1.8	13	0dB	F4.8	21	0dB	F19
6	3dB	F1.8	14	0dB	F5.6	22	0dB	F22
7	0dB	F1.8	15	0dB	F6.8	23	0dB	F28
8	0dB	F2.0	16	0dB	F8	24	0dB	CLOSE

Table. 8-1.

4) Shutter priority mode
The iris value is automatically adjusted to the electronic shutter selected (28 levels). Gain is also adjusted automatically.

5) Iris priority mode
Corresponding to selected iris position (17 different positions), shutter speed is adjusted automatically. Gain is in auto mode.

CAM_Back light

The backlight compensation function increases the brightness in the automatic exposure mode and shutter priority exposure mode (auto-iris AGC). It is useful for correcting the images of subjects which have turned out dark due to background light (sunlight, lamps, etc.). The brightness, when this function is off (auto iris, AGC), is taken as a reference, and the brightness can be increased up to 12 dB. Although the subject becomes brighter, the background will become white and saturate.
The iris and gain operations remain in the auto mode.

CAM_Position Pre-set

Camera functions can be preset in 6 different ways using the position preset function.
Using this function pan/tilt, zoom position, focus (auto, manual positions), white balance, shutter, bright control (iris, gain) can be set to the desired state instantaneously without adjusting backlight compensation each time.

AT (Auto tracing) Mode
MD (Motion Detector) Mode

Please refer to Operating Instruction.

8-6. EVI-D30/D31 Commands

Command Set	Command	VISCA Packet	Comments
CAM_Power	On	8x 01 04 00 02 FF	
	Off	8x 01 04 00 03 FF	
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele (Standard)	8x 01 04 07 02 FF	
	Wide (Standard)	8x 01 04 07 03 FF	
	Tele (Variable)	8x 01 04 07 2Z FF	Z : 2 (low speed) to 7 (high speed)
	Wide (Variable)	8x 01 04 07 3Z FF	
	Direct	8x 01 04 47 0Z 0Z 0Z 0Z FF	ZZZZ : 0000 (Wide) to 03FF (Tele)
CAM_Focus	Stop	8x 01 04 08 00 FF	
	Far	8x 01 04 08 02 FF	
	Near	8x 01 04 08 03 FF	
	Auto focus on	8x 01 04 38 02 FF	
	Manual focus on	8x 01 04 38 03 FF	
	Auto/Manual	8x 01 04 38 10 FF	
	Direct	8x 01 04 48 0Z 0Z 0Z 0Z FF	ZZZZ : 0000 to FFFF The relation between the data and distance is not linear
CAM_WB	Auto	8x 01 04 35 00 FF	
	Indoor mode	8x 01 04 35 01 FF	
	Outdoor mode	8x 01 04 35 02 FF	
	OnePush mode	8x 01 04 35 03 FF	
	OnePush trigger	8x 01 04 10 05 FF	
CAM_AE	Full Auto	8x 01 04 39 00 FF	
	Manual	8x 01 04 39 03 FF	
	Shutter priority	8x 01 04 39 0A FF	
	Iris priority	8x 01 04 39 0B FF	
	Bright control	8x 01 04 39 0D FF	
CAM_Bright	Reset	8x 01 04 0D 00 FF	
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
CAM_Shutter	Reset	8x 01 04 0A 00 FF	
	Up	8x 01 04 0A 02 FF	
	Down	8x 01 04 0A 03 FF	
	Direct	8x 01 04 4A 0Z 0Z 0Z 0Z FF	ZZZZ : 0000 (1/60) to 001B (1/10000sec.)

Table. 8-2 (1).

Command Set	Command	VISCA Packet	Comments
CAM_Iris	Reset	8x 01 04 0B 00 FF	
	Up	8x 01 04 0B 02 FF	
	Down	8x 01 04 0B 03 FF	
	Direct	8x 01 04 4B 0Z 0Z 0Z 0Z FF	ZZZZ : 0000 (CLOSE) to 0011 (F1.8)
CAM_Gain	Reset	8x 01 04 0C 00 FF	
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Direct	8x 01 04 4C 0Z 0Z 0Z 0Z FF	ZZZZ : 0000 (0dB) to 0007 (+18dB)
CAM_Backlight	On	8x 01 04 33 02 FF	
	Off	8x 01 04 33 03 FF	
CAM_Preset	Reset	8x 01 04 3F 00 0Z FF	Z : 0 (position1) to 5 (position6)
	Set	8x 01 04 3F 01 0Z FF	
	Recall	8x 01 04 3F 02 0Z FF	
CAM_KeyLock	Off	8x 01 04 17 00 FF	
	On	8x 01 04 17 02 FF	
IR_Receive	On	8x 01 06 08 02 FF	
	Off	8x 01 06 08 03 FF	not receive IR
	On/Off	8x 01 06 08 10 FF	
IR_ReceiveReturn	On	8x 01 7D 01 03 00 00 FF	When receive IR, output the data.
	Off	8x 01 7D 01 13 00 00 FF	
Wide_conLensSet		8x 01 07 26 00 0Z FF	When using wide con lens, compensats AT sensitivity. Z : 0 (not using) to 7 (x0.6)
AddressSet	broadcast	88 30 01 FF	refer to 8-5page
		8x 30 01 FF	
IF_Clear	broadcast	88 01 00 01 FF	refer to 8-5page
		8x 01 00 01 FF	
CommandCancel		8x 2Z FF	Z : socket No. 0 or 1

Table. 8-2 (2).

Command Set	Command	VISCA Packet	Comments
Pan-tiltDrive	Up	8x 01 06 01 VV WW 03 01 FF	VV : pan speed 01 to 18 (01 to 1C for D31)
	Down	8x 01 06 01 VV WW 03 02 FF	WW : tilt speed 01 to 14 (01 to 18 for D31)
	Left	8x 01 06 01 VV WW 01 03 FF	
	Right	8x 01 06 01 VV WW 02 03 FF	
	UpLeft	8x 01 06 01 VV WW 01 01 FF	
	UpRight	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	Absolute position	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	YYYY : pan position FC90 to 0370 (center 0000)
	Relative position	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	ZZZZ : tilt position FED4 to 012C (center 0000) W : 0 UpRight, 1 DownLeft
	Home	8x 01 06 04 FF	
	Reset	8x 01 06 05 FF	
Pan-tiltLimitSet	Limit set	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	YYYY : pan position FC90 to 0370 (center 0000)
	Limit clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	ZZZZ : tilt position FED4 to 012C (center 0000) W : 0 UpRight, 1 DownLeft
DataScreen	On	8x 01 06 06 02 FF	
	Off	8x 01 06 06 03 FF	
	On/Off	8x 01 06 06 10 FF	
AT_Mode	On	8x 01 07 01 02 FF	
	Off	8x 01 07 01 03 FF	
	On/Off	8x 01 07 01 10 FF	
AT_AE	On	8x 01 07 02 02 FF	
	Off	8x 01 07 02 03 FF	
	On/Off	8x 01 07 02 10 FF	
AT_AutoZoom	On	8x 01 07 03 02 FF	
	Off	8x 01 07 03 03 FF	
	On/Off	8x 01 07 03 10 FF	
AT/MD_Frame _Display	On	8x 01 07 04 02 FF	
	Off	8x 01 07 04 03 FF	
	On/Off	8x 01 07 04 10 FF	

Table. 8-2 (3).

Command Set	Command	VISCA Packet	Comments
AT_Offset	On	8x 01 07 05 02 FF	
	Off	8x 01 07 05 03 FF	
	On/Off	8x 01 07 05 10 FF	
AT/MD_Start/Stop	Start/Stop	8x 01 07 06 10 FF	
AT_Chase	Chase1	8x 01 07 07 00 FF	
	Chase2	8x 01 07 07 01 FF	
	Chase3	8x 01 07 07 02 FF	
AT_Entry	Entry1	8x 01 07 15 00 FF	
	Entry2	8x 01 07 15 01 FF	
	Entry3	8x 01 07 15 02 FF	
	Entry4	8x 01 07 15 03 FF	
MD_Mode	On	8x 01 07 08 02 FF	
	Off	8x 01 07 08 03 FF	
	On/Off	8x 01 07 08 10 FF	
MD_Frame	Setting	8x 01 07 09 FF	
MD_Detect	Frame1/2/1 or 2	8x 01 07 0A 10 FF	
AT_LostInfo		8x 01 06 20 07 20 FF	
MD_LostInfo		8x 01 06 20 07 21 FF	
MD_Adjust	Y Level	8x 01 07 0B 00 0Z FF	Z = 0 to F
	Hue Level	8x 01 07 0C 00 0Z FF	
	Size	8x 01 07 0D 00 0Z FF	
	Display time	8x 01 07 0F 00 0Z FF	
	Refresh mode1	8x 01 07 10 00 FF	
	Refresh mode2	8x 01 07 10 01 FF	
	Refresh mode3	8x 01 07 10 02 FF	
	Refresh time	8x 01 07 0B 00 0Z FF	Z = 0 to F

Table. 8-2 (4).

8-7. EVI-D30/D31 Inquiry Commands

Inquiry	Packet Inq	Packet Reply	Description
CAM_PowerInq	8x 09 04 00 FF	Y0 50 02 FF	On
		Y0 50 03 FF	Off
CAM_ZoomPosInq	8x 09 04 47 FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ : 0000 to 03FF
CAM_FocusAFModeInq	8x 09 04 38 FF	Y0 50 02 FF	Auto
		Y0 50 03 FF	Manual
CAM_FocusPosInq	8x 09 04 48 FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ : 0000 to FFFF
CAM_WBModeInq	8x 09 04 35 FF	Y0 50 00 FF	Auto
		Y0 50 01 FF	Indoor mode
		Y0 50 02 FF	Outdoor mode
		Y0 50 03 FF	OnePush mode
CAM_AEModeInq	8x 09 04 39 FF	Y0 50 00 FF	Full Auto
		Y0 50 03 FF	Manual
		Y0 50 0A FF	Shutter priority
		Y0 50 0B FF	Iris priority
		Y0 50 0D FF	Bright control
CAM_ShutterPosInq	8x 09 04 4A FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ : position
CAM_IrisPosInq	8x 09 04 4B FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ : position
CAM_GainPosInq	8x 09 04 4C FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ : position
CAM_Backlight ModeInq	8x 09 04 33 FF	Y0 50 02 FF	On
		Y0 50 03 FF	Off
CAM_MemoryInq	8x 09 04 3F FF	Y0 50 0Z FF	Z : 0 to 5
CAM_KeyLockInq	8x 09 04 17 FF	Y0 50 00 FF	Off
		Y0 50 02 FF	On
CAM_IDInq	8x 09 04 22 FF	Y0 50 0Z 0Z FF	ZZ : ID
IR_ReceiveModeInq	8x 09 06 08 FF	Y0 50 02 FF	On
		Y0 50 03 FF	Off
VideoSystemInq	8x 09 06 23 FF	Y0 50 00 FF	NTSC
		Y0 50 01 FF	PAL
Wide_conLensInq	8x 09 07 26 FF	Y0 50 00 0Z FF	Z : lens No.
Pan-tiltModeInq	8x 09 06 10 FF	Y0 50 ZZ ZZ FF	ZZZZ : status
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	Y0 50 WW ZZ FF	WW : pan (00 to 18), ZZ : tilt (00 to 14)
Pan-tiltPosInq	8x 09 06 12 FF	Y0 50 0W 0W 0W 0W 0Z 0Z 0Z 0Z FF	WWWW : pan (FC90 to 0370) ZZZZ : tilt (FED4 to 012C)

Table. 8-3 (1).

Inquiry	Packet Inq	Packet Reply	Description
DatascreenInq	8x 09 06 06 FF	Y0 50 02 FF	On
		Y0 50 03 FF	Off
AT/MD_ModeInq	8x 09 07 22 FF	Y0 50 00 FF	Normal mode
		Y0 50 01 FF	AT mode
		Y0 50 02 FF	MD mode
AT_ModeInq	8x 09 07 23 FF	Y0 50 ZZ ZZ FF	ZZZZ : status
AT_EntryInq	8x 09 07 15 FF	Y0 50 00 FF	entry mode1
		Y0 50 01 FF	entry mode2
		Y0 50 02 FF	entry mode3
		Y0 50 03 FF	entry mode4
MD_ModeInq	8x 09 07 24 FF	Y0 50 ZZ ZZ FF	ZZZZ : status
AT_ObjectPosInq	8x 09 07 20 FF	Y0 50 VV WW ZZ FF	VV : X (04 to 2A), WW : Y (03 to 1B) ZZ : status 00 (setting), 01 (working), 10 (lost a subject), 11 (memorizing)
MD_ObjectPosInq	8x 09 07 21 FF	Y0 50 VV WW ZZ FF	VV : X (04 to 2A), WW : Y (03 to 1B) ZZ : status 00 (setting), 01 (undetect) 02 (detecting), 03 (memorizing)
MD_Y LevelInq	8x 09 07 0B FF	Y0 50 00 0Z FF	Z : 0 to F
MD_Hue LevelInq	8x 09 07 0C FF	Y0 50 00 0Z FF	
MD_SizeInq	8x 09 07 0D FF	Y0 50 00 0Z FF	
MD_Disp. TimeInq	8x 09 07 0F FF	Y0 50 00 0Z FF	
MD_Ref. ModeInq	8x 09 07 10 FF	Y0 50 00 FF	Refresh mode1
		Y0 50 01 FF	Refresh mode2
		Y0 50 02 FF	Refresh mode3
MD_Ref. TimeInq	8x 09 07 11 FF	Y0 50 00 0Z FF	Z : 0 to F
IR_ReceiveReturn		Y0 07 7D 01 04 00 FF	Power ON/OFF
		Y0 07 7D 01 04 07 FF	Zoom Tele/Wide
		Y0 07 7D 01 04 38 FF	AF ON/OFF
		Y0 07 7D 01 04 33 FF	CAM_Backlight
		Y0 07 7D 01 04 3F FF	CAM_Memory
		Y0 07 7D 01 06 FF	Pan-tiltDrive
		Y0 07 7D 01 07 23 FF	AT_Mode ON/OFF
		Y0 07 7D 01 07 24 FF	MD_Mode ON/OFF

Table. 8-3 (2).

8-8. Code List

Code list for Shutter, Iris, Gain and Wide con lens

Code	Shutter (1/X sec.)	Iris	Gain (dB)
0	60 (D31 : 50)	CLOSE	– 3
1	60	F28	0
2	75	F22	3
3	90	F19	6
4	100	F16	9
5	125 (D31 : 120)	F14	12
6	150	F11	15
7	180	F9.6	18
8	215	F8	
9	250	F6.8	
A	300	F5.6	
B	350	F4.8	
C	425	F4	
D	500	F3.4	
E	600	F2.8	
F	725	F2.4	
10	850	F2	
11	1000	F1.8	
12	1250		
13	1500		
14	1750		
15	2000		
16	2500		
17	3000		
18	3500		
19	4000		
1A	6000		
1B	10000		

Code	Wide Con lens No.
0	1.0
1	0.9
2	0.85
3	0.8
4	0.75
5	0.7
6	0.65
7	0.6

Code list for Pan/Tilter status

Z	Z	Z	Z	
0 - - -	- - - -	0 - - -	- - - 1	Pan left end
0 - - -	- - - -	0 - - -	- - 1 -	Pan right end
0 - - -	- - - -	0 - - -	- 1 - -	Tilt up end
0 - - -	- - - -	0 - - -	1 - - -	Tilt down end
0 - - -	- - - -	- - 00	- - - -	Pan normal
0 - - -	- - - -	- - 01	- - - -	Pan position error
0 - - -	- - - -	- - 10	- - - -	Pan mechanical failure
0 - - -	- - 00	0 - - -	- - - -	Tilt normal
0 - - -	- - 01	0 - - -	- - - -	Tilt position error
0 - - -	- - 10	0 - - -	- - - -	Tilt mechanical failure
0 - - -	00 - -	0 - - -	- - - -	Pan/Tilt no move
0 - - -	01 - -	0 - - -	- - - -	Pan/Tilt moving
0 - - -	10 - -	0 - - -	- - - -	Pan/Tilt moving finished
0 - - -	11 - -	0 - - -	- - - -	Pan/Tilt moving failed
0 - 00	- - - -	0 - - -	- - - -	Pan/Tilt not initialized
0 - 01	- - - -	0 - - -	- - - -	Pan/Tilt under initialize
0 - 10	- - - -	0 - - -	- - - -	Pan/Tilt initialize finished
0 - 11	- - - -	0 - - -	- - - -	Pan/Tilt initialize failed

Code list for AT mode status

0 - - -	- - - -	0 - - -	- - 00	AT frame chase
0 - - -	- - - -	0 - - -	- - 01	AT pan chase
0 - - -	- - - -	0 - - -	- - 10	AT frame/pan chase
0 - - -	- - - -	0 - - -	- 1 - -	AT offset
0 - - -	- - - -	0 - - -	1 - - -	AT AE on/off
0 - - -	- - - -	0 - - 1	- - - -	AT zoom on/off
0 - - -	- - - -	0 - 1 -	- - - -	At frame display on/off
0 - - -	- - 00	0 - - -	- - - -	AT setting
0 - - -	- - 01	0 - - -	- - - -	AT working
0 - - -	- - 10	0 - - -	- - - -	AT lost
0 - - -	- - 11	0 - - -	- - - -	AT memorizing

Code list for MD mode status

0 - - -	- - - -	0 - - -	- 000	MD detection method
0 - - -	- - - -	0 - - -	- 001	MD setting
0 - - -	- - - -	0 - - -	- 01x	MD undetect
0 - - -	- - - -	0 - - -	- 10x	MD detecting
0 - - -	- - - -	0 - - -	- 11x	MD memorizing
0 - - -	- - - -	0 - - 0	1 - - -	MD frame 1
0 - - -	- - - -	0 - - 1	0 - - -	MD frame 2
0 - - -	- - - -	0 - - 1	1 - - -	MD frame 1 or 2
0 - - -	- - - -	0 - 1 -	0 - 1 -	MD frame display

8-9. VISCA Communications Examples

Network initialization (The receiving data is for when 3 VISCA devices are connected.)

Sending	Receiving	Function
88 01 00 01 FF		Clear message (broadcast)
	88 01 00 01 FF	Reply to Clear message
88 30 01 FF		Address message (broadcast)
	88 30 04 FF	Reply to Address message (broadcast)

The 3rd byte of the reply to an address message is the number of connected devices plus 1. In this example, three devices are connected, so this byte is 04.

Setting the focus position of the first EVI-D30/D31 to 0105H.

Sending	Receiving	Function
88 01 04 48 00 01 00 05 FF		Focus Direct command
	90 41 FF	ACK of Focus Direct command
	90 51 FF	Focus Direct command completed

Setting the focus position of the first EVI-D30/D31 to 0105H.

Sending	Receiving	Function
81 01 04 07 02 FF		Zoom Tele command
	90 41 FF	ACK of Zoom Tele command
	90 51 FF	Zoom Tele command completed (zoom tele starts)
81 01 04 07 00 FF		Zoom Stop command
	90 41 FF	ACK of Zoom Stop command
	90 51 FF	Zoom Stop command completed (zoom tele stops)

CAM_Zoom Tele/Wide and CAM_Focus Far/Near work until Camera_Zoom Stop, Camera_Focus Stop or other command is sent. CAM_Zoom Tele/Wide and CAM_Focus Far/Near can not be sent simultaniousely.

Inquiry about whether AF is ON or OFF, the position of zoom and the position of focus.
(In case it is inquired continually)

Sending	Receiving	Function
81 01 04 47 FF		ZoomInq command
	90 41 FF	ACK of ZoomInq command (socket 1)
81 01 04 38 FF		AFModeInq command
	90 50 02 FF	Auto Focus Mode
81 01 04 48 FF		FocusInq command
	90 42 FF	ACK of FocusInq command (socket 2)
	90 51 00 02 01 0E FF	Zoom Position 021EH (socket 1)
	90 52 00 01 00 05 FF	Focus Position 0105H (socket 2)

In case of Inquiry command, it might take around 0.5 second to receive the reply after the command is sent.
In case of sending the second command before receiving the first reply, ACK socket number and the completion message socket number should be checked.